Meola Catchment 2011 Environmental Monitoring Report

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Meola Catchment 2011 Environmental Monitoring Report

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1.0 Executive Summary

This report presents the results from sampling undertaken in the Meola catchment by Morphum Environmental Ltd (Morphum) on behalf of Auckland Council Stormwater Unit (Auckland Council) over summer/autumn 2010/11 as part of the Meola Catchment 2011 Environmental Monitoring Study (2011 EMS).

Background

This project has been included within the Integrated Stormwater Planning Programme: Environmental Monitoring for combined catchments in Auckland Central as the Meola Catchment 2011 Environmental Monitoring Study. The Integrated Stormwater Planning Programme includes the catchments influenced by the Central Interceptor Project, being Meola, Motions, Oakley, Cox's and Whau Creeks in Auckland Central.

The Central Interceptor Project aims to develop trunk wastewater capacity that will create opportunities to reduce existing combined sewer overflows and potentially integrate with stormwater catchment management objectives.

The proposed monitoring was evaluated by the programme office in terms of the objectives of the wider planning programme. These objectives were to support planning efforts in the combined catchments, network consent applications and evaluate approaches to compliance monitoring.

Objectives

The objective of the 2011 EMS is to gather sufficient data to inform the development of a wider monitoring study over multiple catchments. In addition, the data gathered is intended to support initial modelling of the contaminant loading and water quality processes for the stream and harbour receiving environments for the Meola catchment.

The monitoring is also intended to provide information regarding the baseline state of the receiving environment, and the impact stormwater and combined sewer overflow (CSO) discharges have on the receiving environment during wet weather events.

This monitoring programme followed the sampling of an isolated wet weather event in April 2010 that was undertaken within the same catchment by Morphum for Watercare Services Ltd (Watercare).

Methodology

A combination of continuous, dry (baseline) and wet weather monitoring has been included in the programme to provide a comprehensive study of the discharges on the receiving environment. Continuous data loggers were installed at several sites within the Meola catchment to measure flow, water level, temperature, dissolved oxygen and pH.

Baseline monitoring was carried out at three freshwater sites (Meo_DS, Meo_MID, Meo_US), one harbour site (Meo_HB), and four marine sites (Point Chevalier_1-4), once per month between November 2010 and January 2011. Samples were tested for metals, microbiology, hydrocarbons, total suspended solids (TSS) and dissolved oxygen (DO). Selected samples were also tested for campylobacter and norovirus.

Wet weather monitoring required capturing the first discharge from the CSO with synoptic manual sampling at various other sites in order to characterise the effects the discharge has on the receiving environment. Four marine sites (Point Chevalier 1-4), one harbour site (MEO_HB), two catchment discharge sites (Meo_CSO, Meo_SW) and two freshwater sites (Meo_US, Meo_DS) were included in this component of the monitoring programme. Samples were tested for the same parameters as for dry weather sampling, with volatile matter and particle size distribution tests added. Marine sample timing was determined based on the Coastal Receiving Environment Assessment (CREA) model and the phase of the tidal cycle when the CSO overflowed.

Continuous Monitoring Results

Continuous monitoring revealed that dissolved oxygen and temperature exhibit clear diurnal variation with the upper site (Meo_MID_AAG) experiencing more exaggerated diurnal fluctuations than the lower stream site (Meo_DS). At the Meo_MID_AAG site, dissolved oxygen regularly falls to 0 ppm at night, below the life-supporting capacity for aquatic fauna.

During rain events, dissolved oxygen increased with turbulence from higher flows. Often dissolved oxygen sag (reduction in dissolved oxygen) was seen as the dissolved oxygen decreased then recovered if sufficient flows flushed the loadings of contaminants in suspension. The sag was more evident in smaller storm events that lack a corresponding flushing during the event.

There was a clear relationship between rainfall and groundwater level in the catchment which is dominated by the Western Springs Aquifer system. The higher groundwater levels following rainfall can lead to greater oxygenation and aid recovery of dissolved oxygen to healthy levels. This is particularly evident in the upper Meola Creek where the difference between the ground water inputs can range from almost 2 $L\ s^{-1}$ to over 50 $L\ s^{-1}$ of baseflow during periods of higher groundwater level.

A diurnal cycle was evident for pH, relating to daily changes in algal photosynthesis in the creek. Rainfall also affected pH, with lower pH evident following rainfall and a prolonged recovery time to a more neutral range, in the receiving environment. Turbidity monitoring was largely unsuccessful due to sensor fouling from algal growth and snail presence, although some wet weather turbidity results give an indication of turbidity variation across wet weather events.

Dry Weather Baseline Sampling Results

During dry weather baseline sampling, all stream sites were at risk of microbiological contamination for contact recreation, exceeding the Ministry for the Environment (MfE) contact recreation guideline level of 550 cfu/100mL. A dry weather overflow (DWO) was observed and reported during the December and January baseline sampling, which had an adverse impact on water quality. Evidence of wastewater and associated poor water quality at the Meo_US site indicates that this catchment, which has a separated stormwater and wastewater network, still has wastewater inputs. On 15th April 2011 a survey of the catchment found a private cross connection that may be the source of this wastewater, which has since been remedied.

None of the Point Chevalier sites (marine sites) had *E. coli* or Enterococci levels of concern during the dry weather baseline monitoring with all but two samples below detection levels. However, norovirus was detected at PtChev2 but not PtChev4 during December baseline sampling.

Zinc levels exceeded ANZEEC guideline values for ecosystem protection for slightly to moderately disturbed aquatic or freshwater ecosystems for 50% of samples. Hydrocarbons were not found during baseline sampling.

Biofilm sampling indicated that Meola Creek has mid-range stream health, with generally higher scores at the downstream site (Meo_DS) (i.e. less impacted). Biofilm metal concentrations were elevated at the upstream site (Meo_US), with zinc up to 20 times higher than the sediment quality guidelines. At the downstream site, zinc levels were significantly higher than recommended guidelines with up to six times the trigger value.

Auckland Council commissioned ecological monitoring, including stream ecological valuations, macroinvertebrates and fish, at four sites within Meola Creek. This sampling was undertaken between April and June 2011 and confirmed the pattern of increasing stream health from upstream to downstream, observed in the water quality monitoring programme.

Wet Weather Sampling Results

Two wet weather events were sampled during the course of the monitoring programme. The first event occurred on 28/01/2011 and followed three days of dry weather with 7.5 mm of rainfall over a 3.5 hour period prior to the CSO overflowing. The second wet weather event occurred on 16/04/2011, following eight days of dry weather and 3.5 mm of rainfall over 1 hour 20 minutes prior to the CSO overflowing. As the second event followed a longer dry period, and had a faster increase in overflow rate at the start of the storm, contaminant concentrations, including *E. coli* and total suspended solids, were generally higher and exhibited a more exaggerated 'first flush' effect.

Conclusions

The monitoring programme has identified three key areas for consideration. These are summarised as follows:

Public health risk: Both during baseline and wet weather sampling, members of the public were observed undertaking recreation in the marine receiving environment. Baseline monitoring has identified DWO's and subsequently norovirus in the downstream and marine receiving environment. In addition, *E. coli* has been above recreational contact guidelines at most sites, during the majority of occasions throughout the sampling period.

Insufficient information is currently available to accurately determine the persistence and residence time of public health risk indicator bacteria in the receiving environment. This has subsequent impacts on the time at which it is safe for the public to swim. It is expected that initial modelling or extension of the wet weather sample period will help to define the duration of the public health risk following wet weather events.

Oxygen demand: Continuous dissolved oxygen monitoring has identified the variation in dissolved oxygen throughout the catchment due to varying discharges and in-stream processes. In particular variation in aquifer inputs has a strong influence on dissolved oxygen. The upper catchment experiences severe troughs in dissolved oxygen which appear to worsen following small storm events resulting in CSO overflows. In these small events, insufficient flows occur to enable flushing of contaminants from the upper section, resulting in deposition of contaminants and persistent effects following the wet weather event.

In general key management items to address the oxygen demand and subsequent lowered dissolved oxygen, life supporting capacity and amenity in the stream may include, reduction of organic loadings, in addition to maintenance of baseflow for re-oxygenation and reduction of water temperatures through shading and reduced impervious surfaces. It is considered that the upper Meola Creek provides a particular opportunity for improvement.

Contaminant loads and first flush: There was evidence of an increased concentration of many contaminants in the first flush from discharge points. These contaminants were typically those that would have washed off roads or come from settled wastewater solids in the pipe network. Metals in particular were present in the baseline samples including high concentrations in biofilm samples.

Based on the first flush contaminant information from this study, efficiency of infrastructure provision could be gained from avoiding, remedying or mitigating the initial volumes of water discharging into the receiving environment as a priority as these are the 'dirtiest'.

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1.3 Glossary and Abbreviations List

Abbreviation	Description
Baseline	Baseline sampling refers to the sampling undertaken in dry conditions (3 antecedent dry days)
BCI	Bacterial Community Index
BCP	Bacterial Community Profile
Biofilm	The slimy substance that forms on hard surfaces in streams
BOD	Biochemical Oxygen Demand
CI	Central Interceptor
COD	Chemical Oxygen Demand
CREA	Coastal Receiving Environment Assessment model produced by University of Auckland and Metrowater as part of the Integrated Catchment Studies
CSO	Combined Sewer Overflow
DO	Dissolved Oxygen
DWO	Dry Weather Overflow
ICS	Integrated Catchment Study
LACSO	Lyons Ave Combined Sewer Overflow
MAGS	Mt Albert Grammar School
Mighty Gripper	A sampling device, extendable 3 metres into stream. Reduces risk of contamination and allows access to otherwise difficult sites.
PAH	Polycyclic Aromatic Hydrocarbons
SEV	Stream Ecological Valuation
SW	Stormwater
TKN	Total Kjedahl Nitrogen
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
VSS	Volatile Matter
WW	Wastewater

2.0 Introduction

This report presents the results from three months of sampling undertaken by Morphum Environmental Ltd (Morphum) on behalf of Auckland Council Stormwater Unit (Auckland Council) over summer 2010/11 as part of the Meola Catchment 2011 Environmental Monitoring Study ('2011 EMS'). This is a part of the Integrated Stormwater Planning Programme: Environmental Monitoring (the Programme). The 2011 EMS incorporates several sampling regimes into one monitoring study. These are continuous, baseline and wet weather event monitoring, and include fresh and marine waters and point-source discharges.

The 2011 EMS is intended as the precursor to a broader scale monitoring programme planned to involve 12 months of sampling in multiple catchments. It has been designed to inform decision making regarding the larger proposed monitoring programme. The programme followed sampling of an isolated wet weather event in April 2010 (Clarke, 2010a) that was undertaken within the same catchment by Morphum for Watercare Services Ltd (Watercare).

The purpose of the monitoring is to provide information regarding the baseline state of the receiving environment, and the impact stormwater (SW) and combined sewer overflow (CSO) discharges have on the receiving environment during wet weather events. The study was conducted over summer when the assimilative capacity of the stream is expected to be at its lowest.

2.1 Reporting

This report presents the results obtained by Morphum Environmental Ltd between November 2010 and July 2011. This includes continuous monitoring data at two sites for up to seven months, monthly baseline data for three freshwater and five marine sites on three occasions and two wet weather events. The initial planned sample period of three months was extended for the continuous monitoring to encompass a second wet weather event. Reference has also been made to results obtained in the April 2010 wet weather sampling project. This was an earlier wet weather event sampling of a CSO discharge and limited stream sites.

The methods outlined in this report are a summary of those previously reported by Morphum Environmental Ltd in November 2010 (Clarke & Coup, 2010).

Summarised results have been presented in Sections 5, 6 and 7 of the report. Interpretation is generally limited to Section 8 as this is outside the scope of the project and the data collected will be used to support modelling exercises which are likely to reveal more information on catchment contaminant patterns.

Information pertaining to the installation and calibration of the continuous loggers is included in Appendix B: Monitoring Device Quality Records and a database of all results are included in Appendix C: Results Database.

A memo produced in 2010 to summarise the results obtained in the April 2010 sampling project is included in Appendix E: April 2010 Meola Wet Weather Monitoring Memo.

During the 2011 monitoring period, although after the three month baseline sampling, Auckland Council commissioned ecological monitoring with four sites in the Meola Creek using the Stream Ecological Valuation (SEV) (ARC TP 302) methodology. These sites were sampled between April and June 2011, and will be reported in a separate document entitled Environmental Monitoring Strategy: Central Interceptor Zone of Influence Streams (Coup, 2011).

2.2 Background

This project has been included within the Integrated Stormwater Planning Programme: Environmental Monitoring for combined catchments in Auckland Central as the Meola Catchment 2011 Environmental Monitoring Study. The Integrated Stormwater Planning Programme includes the catchments influenced by the Central Interceptor Project, being Meola, Motions, Oakley, Cox's and Whau Creeks in Auckland Central.

The Central Interceptor Project aims to develop trunk wastewater capacity that will create opportunities to reduce existing CSOs and potentially integrate with stormwater catchment management objectives. Further details on rationale relating to the development of the initial monitoring programme can be found in Citywide Stormwater Solutions Program Stream Receiving Environment Monitoring Plan (Clarke, 2010b).

The proposed monitoring was evaluated by the programme office in terms of the objectives of the wider planning programme. These objectives were to support planning efforts in the combined catchments, network consent applications and evaluate approaches to compliance monitoring.

2.3 Objectives

The scope of the overall programme and 2011 EMS has been designed to meet objectives of multiple stakeholders.

The objectives for the wider programme are:

- To improve the quality and quantity of data for the receiving environment and the discharges, both during baseline conditions and wet weather events.
- To provide data to define the assimilative capacity of the multiple stream receiving environments within the Central Interceptor study.
- To provide data across the key stream receiving environments in the study area for validation and calibration of environmental simulations.
- To provide suitable spatial and temporal resolution to achieve these objectives.

The objective of the 2011 EMS is:

- To gather sufficient data to inform the development of a wider monitoring study including identification of constraints or limitations and opportunities to achieve the objectives of the wider programme.
- To support initial modelling of the contaminant loading and water quality processes for the stream and harbour receiving environments for the Meola catchment.

3.0 Methodology

A methodology report (Clarke & Coup, 2010) was prepared for the client and relevant audience in November 2010. This section provides a summarised account of the methodologies used in the 2011 EMS.

3.1 Location

Meola Creek flows through the suburbs of Mt Albert and Point Chevalier to the west of Auckland Central Figure 1 and Figure 2 discharging on the western side of Meola reef in the low energy estuarine environment of the upper Waitemata Harbour.
Sites were selected to represent catchment network discharge inputs and the associated receiving environment as detailed following:

- Network Discharge sites:
  - Meo_CSO – located at the Lyons Ave CSO (EDR001). Representative of combined sewer catchment inputs.
  - Meo_SW – located at a manhole in the 918 mm diameter SW line on Malvern Street. Representative of stormwater catchment inputs.
  - Meo_US – located at an open stormwater pit in the Plant and Food grounds near Haverstock Road. This site is representative of upstream stormwater catchment as it is unaffected by combined sewer inputs.
- Freshwater Receiving Environment sites:
  - Meo_MID_AAG – located immediately upstream of the Alberton Ave culvert within Roy Clements Treeway. Representative of the upstream catchment, above significant aquifer inputs.
  - Meo_Mid – located immediately downstream of the Alberton Ave culvert at Norgrove Ave. Characterises the stream catchment upstream (during baseline only) including the inputs within the culvert.
  - Meo_DS – located below Watercare sewer pipebridge at Pasadena Intermediate. Characterises the majority of the freshwater catchment.
  - Meo_HB – located below Meola Road within tidal influence. Characterises entire stream catchment, including some saline influence.
- Marine Receiving Environment sites:
  - PtChev1 – 4 – located along Point Chevalier Beach. Positioned along the tidal flow to provide information pertaining to the movement of contaminants along the popular recreational beach.

Table 1 provides a photograph of each site and the corresponding sampling regime(s).

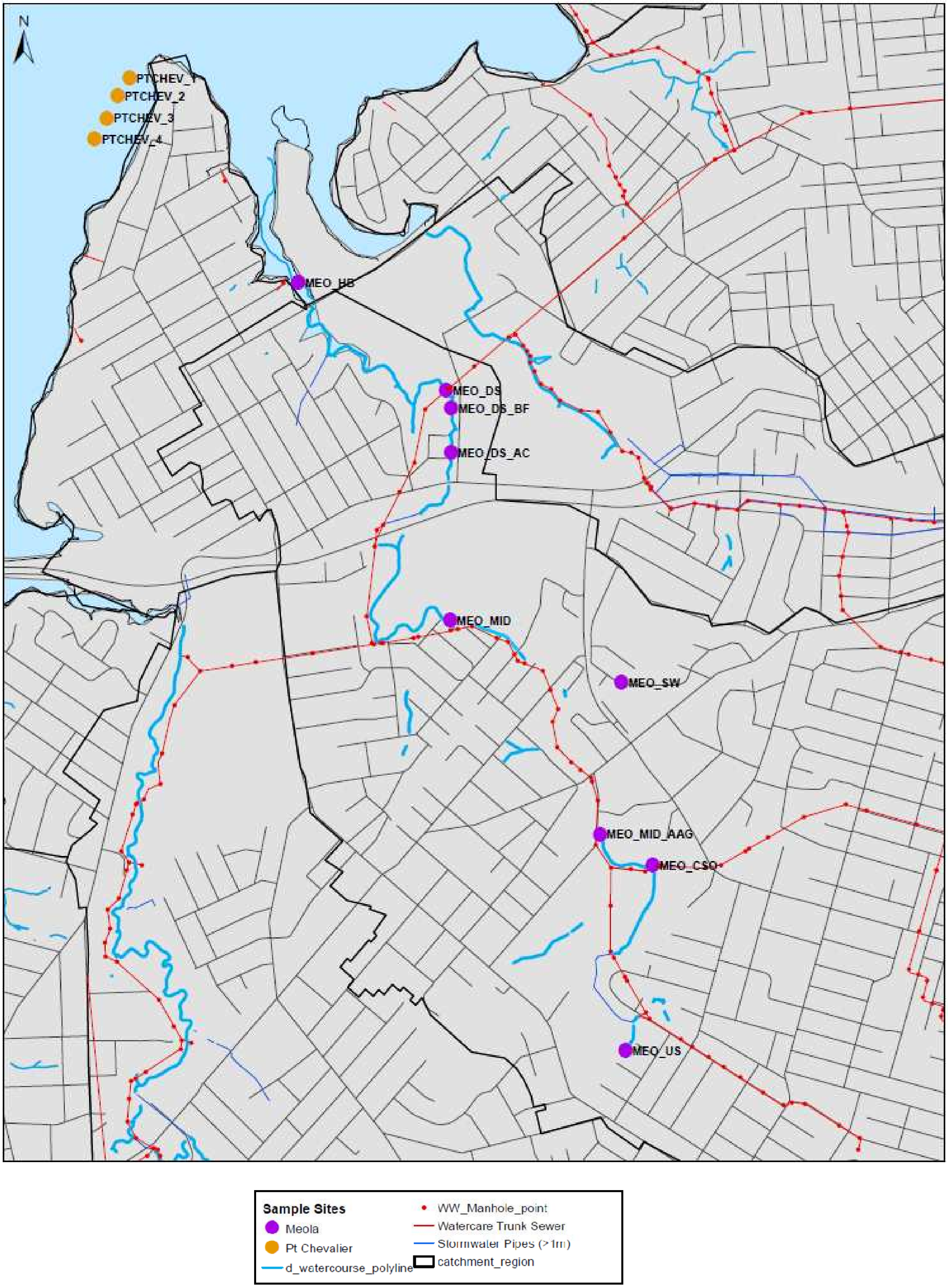


Figure 1: Meola Creek and the sampling sites in relation to the main Watercare Trunk Sewer Line.

Table 1: Meola Creek monitoring site information, including site name, sampling regime and photograph. Refer to Figure 1 for site locations within the catchment.

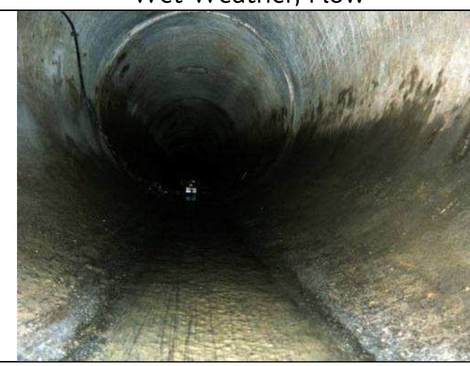
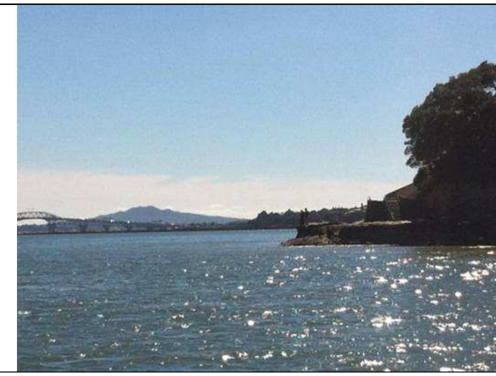
Site Name	Meo_US	Meo_MID	Meo_DS
Regime	Baseline, Wet Weather, Flow	Baseline	Baseline, Wet Weather, Continuous
Photo			
Site Name	Meo_HB	Meo_CSO	Meo_SW
Regime	Baseline, Wet Weather	Wet Weather, Flow	Wet Weather, Flow
Photo			
Site Name	Meo_MID_AAG	Meo_DS (ARC Weir)	Point Chev, Marine Sites 1 - 4
Regime	Flow, Continuous Monitoring	Flow	Baseline, Wet Weather

Photo			

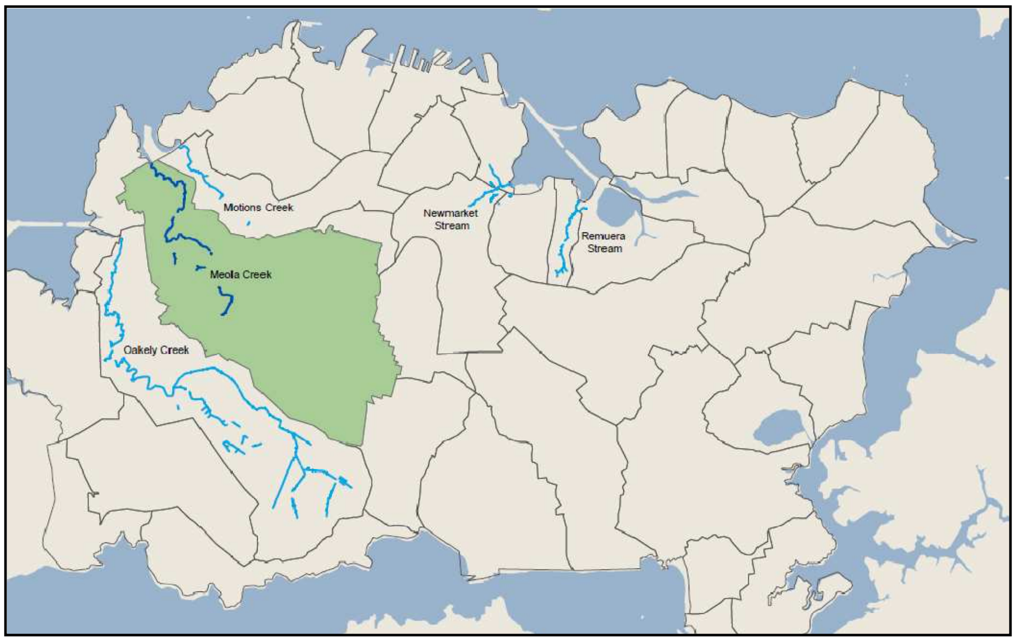


Figure 2: Location map of the Auckland Isthmus with Meola Creek and its catchment highlighted green.

3.2 Continuous Monitoring

Continuous monitors (data loggers) were installed at several locations Table 1 and measured different parameters Table 2. Details regarding the monitors are included in Appendex B: Monitoring Device Quality Records. The two stream sites with water quality parameters measured were selected to provide information on the visibly different upper and lower sections of the stream, while other sites were selected to provide additional flow information for model calibration purposes.

Table 2: Parameters measured, sampling intervals and sampling time periods for continuous monitoring sites.

Site Name	Parameters Monitored	Time Period
Meo_US	Level and Calculated Flow (Water level upstream of v-notch weir)	5 minute intervals, 12/01/2011 - 28/06/2011
Meo_MID_AAG	DO, pH, Temperature, Water Level, Turbidity, Calculated Flow (Water level upstream of V notch weir and Culvert inlet)	5 minute intervals, 19/11/2010 - 28/06/2011
	Flow (Argonaut ultrasonic flow meter) (moved from within culvert to immediately upstream of culvert 11/3/2011)	5 minute intervals, 22/12/2010 - 03/06/2011
Meo_DS	DO, pH, Temperature, Water Level (Partial), Turbidity	5 minute intervals, 19/11/2010 - 28/06/2011
Meo_SW	Flow (Argonaut ultrasonic flow meter)	5 minute intervals, 21/01/2011 - 28/06/2011
Rainfall (5 Sites)	Rainfall gauges at 5 sites, provided by AWT Water Ltd.	10 minute intervals, 23/3/2011 – 28/06/2011
Sites not included in scope but with available data		
Meo_CSO	AWT Overflow weir water level and calculated flow based on AECOM provisional rating curve.	5 minute intervals, 19/11/2010 - 28/06/2011
Meola Weir (Meo_DS)	Auckland Council Flow	15 minute intervals, 19/11/2010 – 8/04/2011, 3/06/2011 - 28/06/2011
MAGS Rainfall	Auckland Council Rainfall	10 minute intervals, 19/11/2010 - 28/06/2011
Selkirk Road	Auckland Council Groundwater	15 minute intervals, 19/11/2010 – 28/06/2011

Data sets were downloaded from the iQuest website and are available as electronic time series files. Continuous data were downloaded, checked and cleaned up for periods of when maintenance and fault occurred. The turbidity data had quality issues at both sites with fouling and snails as further detailed in Section 5.1. Therefore the turbidity data is of limited use.

3.2.1 Flow Calculations

Argonaut flow meters were installed partway through the project at selected sites. These were only capable of capturing flow data after the water level reached 300 mm deep.

For sites without an Argonaut, channel shape and water level were used to calculate flow. A rating curve was provided by Consultants AECOM from the Watercare Sewer Model for the Meo_CSO site, where an AWT Water Ltd monitor captured water level.

Details of the flow calculations are as follows:

- **Meo_US** – Flow was calculated from weir formula for the V notch weir up to 0.65 m depth (0.42 $m^3 s^{-1}$) and mannings formula for the overland flowpath spillway at high flows.

- **Meo_MID AAG** – Flow was calculated for water levels up to 300 m (0.3 $m^3 s^{-1}$) from weir formulae and derived from Argonaut data for flows above this point. The Argonaut data for high flows appears high relative to the downstream site. Therefore the Argonaut has been moved upstream of the weir to confirm flows in a more hydraulically stable location from 9th of March 2011 onwards. It is recommended to use the calculated flow at this site.

- **Meo_DS** – Flow was taken from ex-Auckland Regional Council (ARC) now Auckland Council telemetry. This is based on water levels upstream of a V notch weir. A flow rating curve has been developed for this weir from depth gauging up to 1.3 m (discharges up to 4.3 $m^3 s^{-1}$), and extrapolated for higher flows. A maintenance issue with the stilling well silting up meant the data is not available for part of the time period including the Wet Weather 2 (WW2) event.

- **Meo SW** – Flow was measured with the Argonaut for water levels above 300 mm, or flows above 0.42 $m^3 s^{-1}$. Flow in this 900 mm pipe was rarely sufficient to provide data.

- **Meo CSO** – Flow was calculated from water level data provided by AWT and the infoworks model rating curve provided and verified by AECOM.

3.3 Baseline Monitoring

Baseline monitoring was undertaken between 9 and 10 am on three separate occasions over three months. The dates and times are included in Table 3.

Table 3: Baseline sampling times and dry weather characteristics

Month	Date and Time	Number of antecedent dry days
November	29-11-2010, (plus an additional sample at Meo_DS on 01-12-2010)	8 days (i.e. last rainfall over 2.5mm/day was on 21/11)
December	24-12-2010	4 days (i.e. last rainfall over 2.5mm/day was on 20/12)

Water samples were tested for the following parameters:

- Total and soluble metals (Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Zinc)
- *E. coli* and Enterococci
- Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH)
- Biochemical and Chemical Oxygen Demand
- Turbidity, pH, Alkalinity, Salinity
- Total Suspended Solids (TSS)
- Soluble Reactive Phosphorous (SRP), Total Kjeldahl Nitrogen (TKN), Ammonia Nitrogen
- Norovirus and Campylobacter at selected sites

3.3.1 Biofilm

The University of Auckland was engaged to carry out an assessment of bacterial community profiles from upstream and downstream sites of Meola Creek. For the full report including method, results and references refer to Appendix D: Biofilm Report.

Two sites were assessed to represent the catchment; these were Meo_US and Meo_DS_BF Figure 1. Biofilm samples were taken on two occasions during the sampling period, on the 29-11-2010 and 27-01-2011 during baseline sampling.

The parameters tested were bacterial community profile (BCP), bacterial community index (BCI) and metals concentration within the biofilm.

- BCP = The bacterial community profile for a site provides an ecosystem based tool for comparison between and within sites and is useful in situations where macroinvertebrate fauna may be limited, particularly in urban streams.

- BCI = the bacterial community index is similar to the well-known macroinvertebrate community index (MCI) which is a nationally comparable metric of stream health. The BCI provides data regarding the base-level energy, carbon and nutrient cycling attributes of the stream ecosystem.

- Metals = Total metals are measured in sediment as metals can bind to particles and can provide more accurate and integrated information regarding the state of metal contamination than one-off water sampling.

3.4 Wet Weather Monitoring

Two wet weather events were targeted for the 2011 EMS. The desired storm was in the order of a 95^{th} Percentile storm (which calculates for the Meola catchment to approximately the Water Quality Storm as per ARC TP10). This is considered to include 80% of the total runoff volume from all storms, with a peak intensity of approximately 3 mm 10 $mins^{-1}$, or 8 mm hr^{-1}.

Water samples were tested for the following parameters:

- Total and soluble metals (Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Zinc)
- *E. coli* and Enterococci
- TPH and PAH

- Biochemical and Chemical Oxygen Demand
- Turbidity, pH, Alkalinity, Salinity
- TSS
- SRP, TKN, Ammonia Nitrogen
- Volatile Suspended Solids (VSS), Particle Size Distribution (PSD)
- Norovirus and Campylobacter at selected sites

4.0 Results Reporting

The following sections 5, 6 and 7 provide highlights of water quality results from the Meola Catchment 2011 monitoring study from November 22nd 2010 to June 28th 2011. Where possible, comparisons have been made to guideline values for each water quality parameter. These have referenced the 2005 report entitled Auckland City Stormwater – A summary of NIWA and other relevant studies, NIWA Client Report: AKL2005-007 (Griffiths & Timperley, 2005). In addition some reference is made to the ARC State of the Environment Monitoring water quality objectives which have been derived from two reference sites, Cascades Stream and West Hoe Stream, and represent the best achievable water quality in the Auckland Region.

Full results are included in a database format in Appendix C: Results Database.

5.0 Continuous Monitoring Results

Continuous monitoring data has been summarised and selected graphs are included in the following section.

5.1 Turbidity

Typically, high turbidity is associated with poorer water quality due to higher quantities of suspended and dissolved solids. Baseline turbidity at the Meo_MID_AAG site was higher than at the Meo_DS site.

The time series results for turbidity from both sites were impacted by data quality issues. The Meo_DS sensor suffered from 'noise' as a result of *Potamopyrgus* snails moving across the surface of the turbidity sensor Figure 3. The turbidity sensor at Meo_MID_AAG suffered from excessive fouling due to abundant sunlight, high temperatures and nutrient loadings generating rapid algal growth (Figure 4). This sensor has therefore produced data that is considered to be unreliable. Despite frequent cleaning the sensor would 'foul' too quickly, and results for dry periods are inaccurate. A self-cleaning sensor was suggested; however approval from Council was not received within the initial project timeframe. Data, therefore, needs to be treated with caution, but could give indication of turbidity time series data for wet weather events.

Figure 3: *Potamopyrgus* snails on sensor at Meo_DS influenced data quality (14-01-2011).

Figure 4: Sensors at Meo_MID_AAG site have experienced rapid algal growth reducing accuracy of the equipment.

5.2 Dissolved Oxygen and Temperature

Dissolved oxygen and temperature are both strongly influential for the life-supporting capacity of aquatic ecosystems (Richardson et al, 1994; NIWA, 2010) Diurnal variations were evident in temperature and dissolved oxygen (Figure 5), as is typical in stream environments (Chapman, 1992). It is unlikely the DO and temperature sensors experienced the same unreliability issues as the turbidity sensor. Calibration testing carried out on multiple occasions returned data that is within 1 ppm DO and 0.5˚C temperature which meets Auckland Regional Council 'fair' and 'good' quality guidelines respectively.

During dry weather, temperature was higher at the Meo_MID_AAG site (average 24.7˚C) than at Meo_DS (average 19.5˚C), likely influenced by slower flows and less aquifer inputs to reduce temperatures. The impact of high temperatures on aquatic fauna is dependent on the life stage of the individual and the exposure time. Temperatures below 21˚C are preferred for most fish species (Richardson et al., 1994), while temperatures above 24.5˚C may affect macroinvertebrates after a 48 hour exposure period (Quinn et al., 1994). The approximate location of potentially lethal temperatures in relation to the results obtained at the Meo_MID_AAG monitoring site is shown in Figure 6.

The ANZECC guidelines for DO is 6.5 g m^{-3} [1], however, ANZECC also recommends referring to local information to determine what is 'normal' for the geographic region of interest. The Auckland Regional Council River Water Quality Annual Report 2009 surveyed 31 sites across the region and recorded a range of median dissolved oxygen concentration from 7.2 to 12.6 ppm. NIWA have recently produced guideline dissolved oxygen levels for New Zealand fish communities (Table 4).

[1] g m^{-3} is approximately equivalent to mg/L and ppm (parts per million)

Table 4: Recommended dissolved oxygen levels for protection of freshwater fish. Imperative protection level is the minimum recommended protection level (NIWA, 2010).

Dissolved Oxygen		Early Life Stages	Adults
30-day mean (mg L^{-1})	Guideline	9.0	8.0
	Imperative	6.5	6.0
7-day mean (mg L^{-1})	Guideline	7.5	6.5
	Imperative	5.5	5.0
7-day mean minimum (mg L^{-1})	Guideline	6.0	5.0
	Imperative	5.0	4.0
1-day minimum (mg L^{-1})	Guideline	6.0	4.0
	Imperative	4.0	3.0

At night the Meo_MID_AAG site had levels of DO below that capable of sustaining life and well below the imperative concentrations listed in Table 4 (average of 0 ppm during dry weather). Meo_DS however, is located in an area with higher aquifer inputs than Meo_MID_AAG which leads to higher velocities and turbulence allowing reaeration of the water column. For example, dissolved oxygen reached its lowest point overnight at an average of 4.32 ppm compared to 0 ppm at Meo_MID_AAG.

Following wet weather events, several patterns were noted (Figure 6)

- A rise in DO was seen during the event due to increased turbulence from higher flows and the contribution to flow of rainwater and surface runoff that would have a DO saturation close to 100%.

- A DO sag was seen where the DO decreased then recovered following loadings of contaminants in suspension. This sag is more evident for smaller storm events that lack a corresponding flushing during the event and increase in baseflow following the event.

- Scour and reduction of algal biomass may reduce the daytime production of oxygen from photosynthesis and night time respiration that consumes oxygen resulting in smaller diurnal variations.

Two key physical processes influencing these patterns are oxygen demand and base flow re-aeration. These are discussed further in Section 8.1 below.

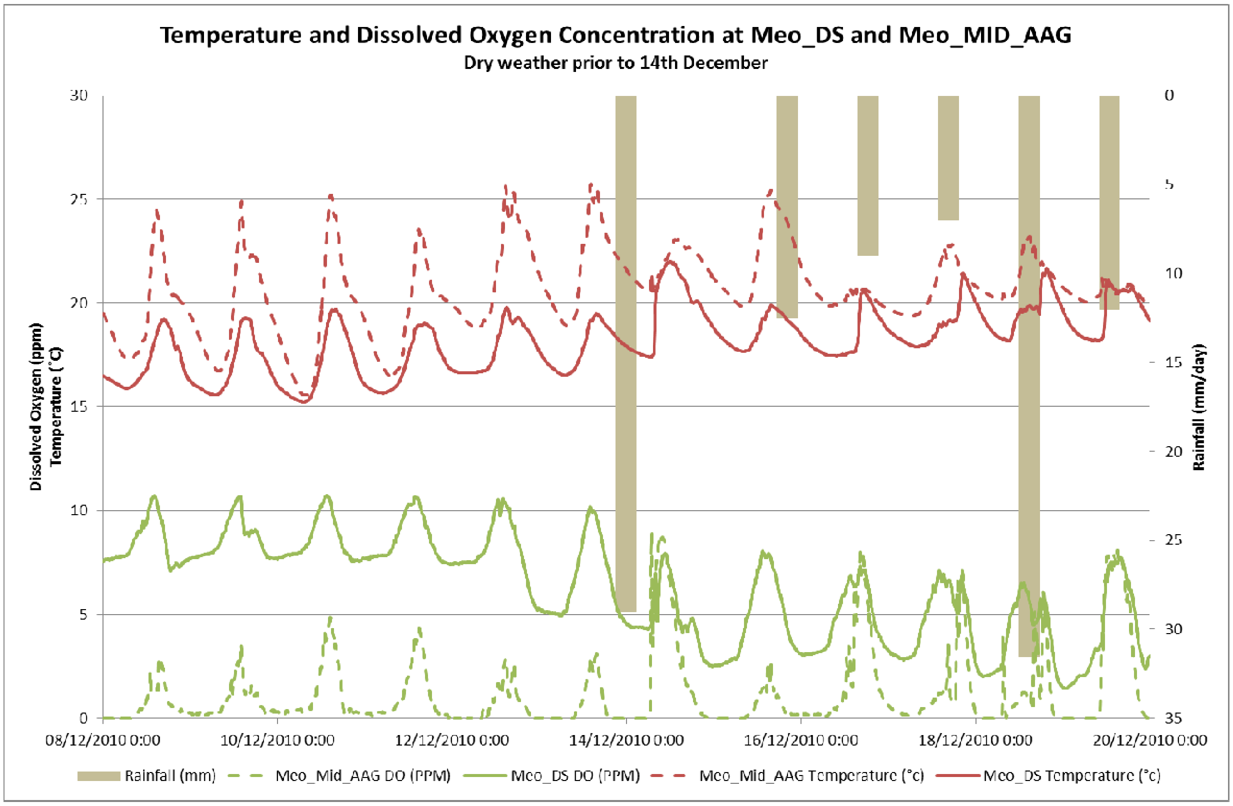


Figure 5: Comparison between Meo_MID_AAG and Meo_DS sites for dissolved oxygen and temperature over a dry period ending in a wet weather event.

Note difference in diurnal variation peaks and troughs. In addition there is an obvious 'sag' and subsequently longer recovery period following the wet weather event.

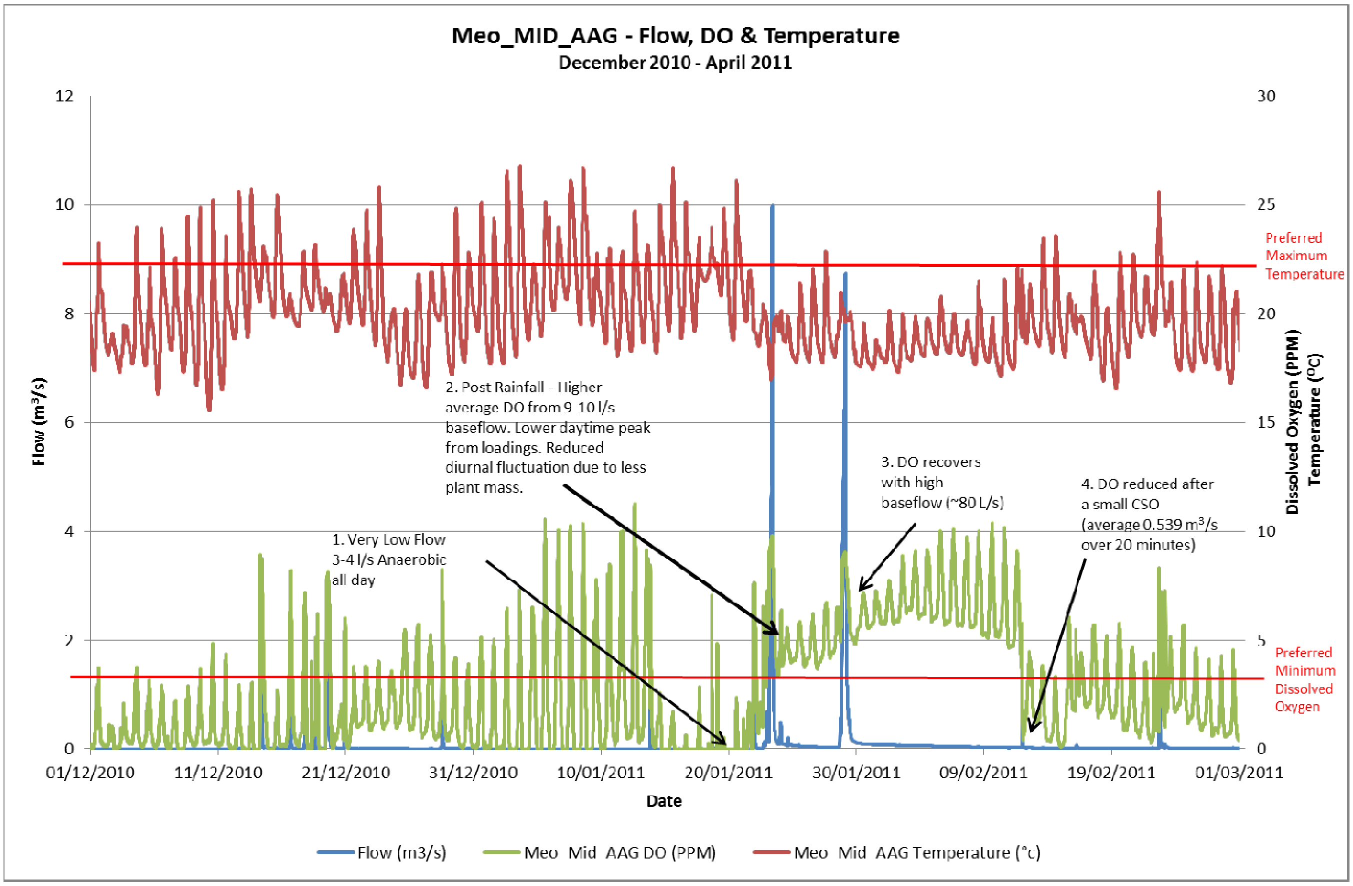


Figure 6: Three month trends identified for dissolved oxygen and temperature in relation to flow at Meo_MID_AAG site.

1. Following a small rain event in mid-January, the Lyons Ave CSO overflowed; dissolved oxygen decreased to zero and took several days to recover, during which time the CSO overflows again. 2. After several days of rain the baseflow fluctuates resulting in higher nocturnal dissolved oxygen however lower daytime peaks due to less plant biomass. 3. Two larger rain events in late-January provide enough rain to increase baseflow water level resulting in higher dissolved oxygen and lower stream temperatures. 4. However, one small CSO lasting only 20 minutes is sufficient to significantly reduce dissolved oxygen in stream.

5.3 Flow (including Groundwater influence)

In all cases the Meo_MID_AAG site had lower dissolved oxygen than the Meo_DS site. It is considered that this is largely due to the comparatively higher flows in the lower Meola Creek, in particular during dry weather conditions due to the aquifer inputs through the system. The Meo_DS site has more than ten times the baseflow of the upstream Meo_MID_AAG site. Flow data for each site has been summarised in Table 5 below.

Table 5: Flow ranges for baseline and wet weather flow.

Site Name	Typical Baseline Flow Range	Wet Weather Event 1 Range	Wet Weather Event 2 Range
Meo_US	0.001 – 0.002 $m^3 s^{-1}$ (based on rating curve)	0.001 - 0.645 $m^3 s^{-1}$	0.001 – 0.511 v
Meo_MID_AAG	0.004 – 0.007 $m^3 s^{-1}$	0.029 – 8.665 $m^3 s^{-1}$	0.010 - 3.543 $m^3 s^{-1}$
Meo_SW	N/A Argonaut only measures above a certain level (>0.300 m)	0.45 – 0.673 $m^3 s^{-1}$	No data for 16/04 rain event assume depth did not reach >0.300m
Meo_DS (ARC Weir)	0.074 – 0.09 $m^3 s^{-1}$	0.123 – 5.373 $m^3 s^{-1}$	Not available
Meo_CSO	N/A CSO flow data above 0.615 m only	1.363 – 2.053 $m^3 s^{-1}$	0.031 – 2.035 $m^3 s^{-1}$

Figure 7 shows the effect of rainfall across the sample period causing the groundwater levels to rise.

Figure 8 shows the changes to baseflow given the changing aquifer water levels. This clearly indicates that when there are higher groundwater levels, there is higher baseflow in the streams, and in particular the upstream portion exhibits greater variability.

High flows have also been recorded and are available as time series for modelling purposes. The flows and event volumes in the upper catchment measured at Meo_MID_AAG appear to be higher than those measured in the lower catchment. This may be due to the in-channel storage and routing and surface groundwater interactions that occur in the catchment. However, this may also be due to the flow gauges over estimating flow at the Alberton Ave site. Therefore modelling may need to utilise water level at this site for calibration purposes.

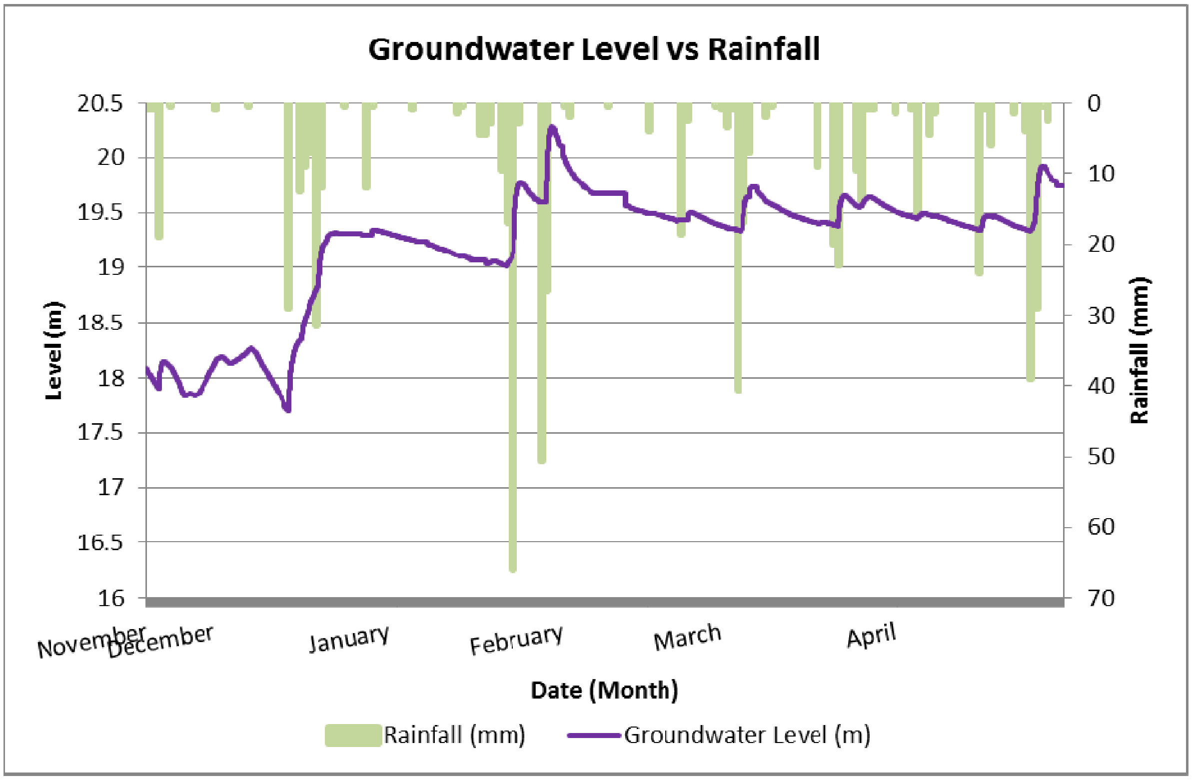


Figure 7: Groundwater (Selkirk response to rainfall (MAGS Gauge) within the Meola Catchment over summer and early autumn 2010/11.

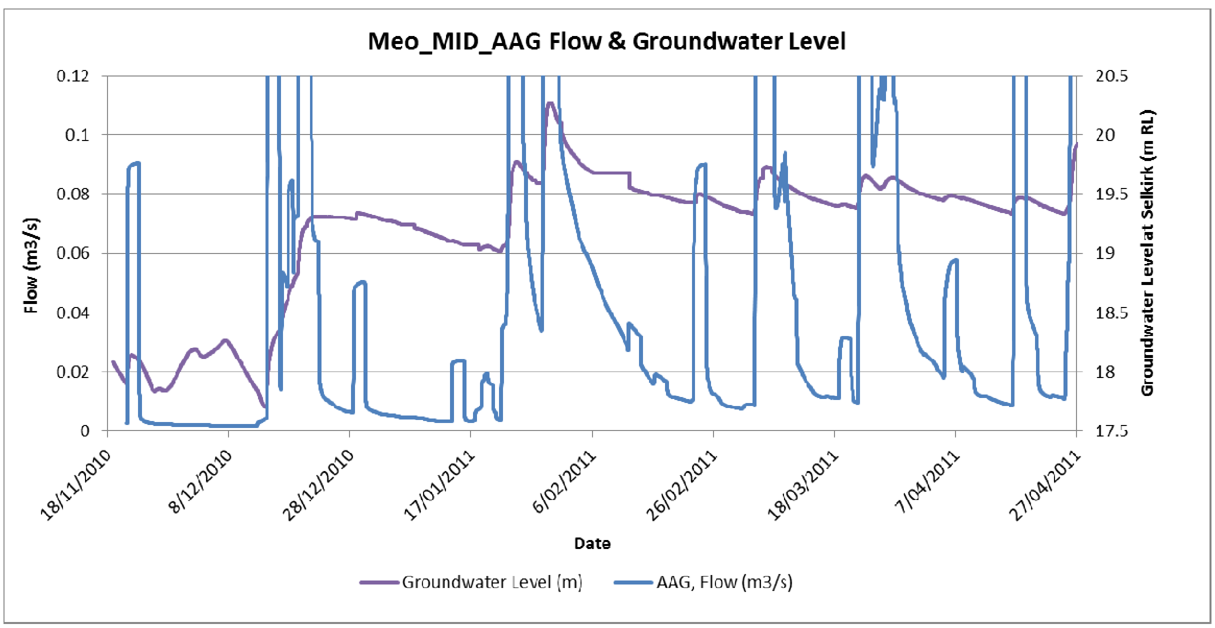


Figure 8: Relationship between flow at Meola_MID_AAG (graphed as 2-day rolling average) and groundwater level (Selkirk) over summer 2010/11.

5.4 pH

The pH of a stream is important as it influences several biological and chemical processes within the water. pH values within a natural system are expected to remain at a consistent level ranging between 6.0 and 8.0 pH units (Chapman, 1992).

The median pH range for the regional monitoring programme across all sites in 2009 was 6.4 to 7.9 pH units (Neale, 2010).

Diurnal variations were evident at both sites with similar peaks. The Meo_MID_AAG site showed a more pronounced diurnal pH fluctuation which is likely to be a result of the higher levels of algae present influencing photosynthesis which subsequently affects pH (Chapman, 1992). Following rain events, the pH decreases significantly with a prolonged 'recovery' time. This is typically due to the dissolution of atmospheric carbon dioxide within rainfall, meaning that rainwater and surface runoff will tend to be slightly acidic (FISRWG, 1998).

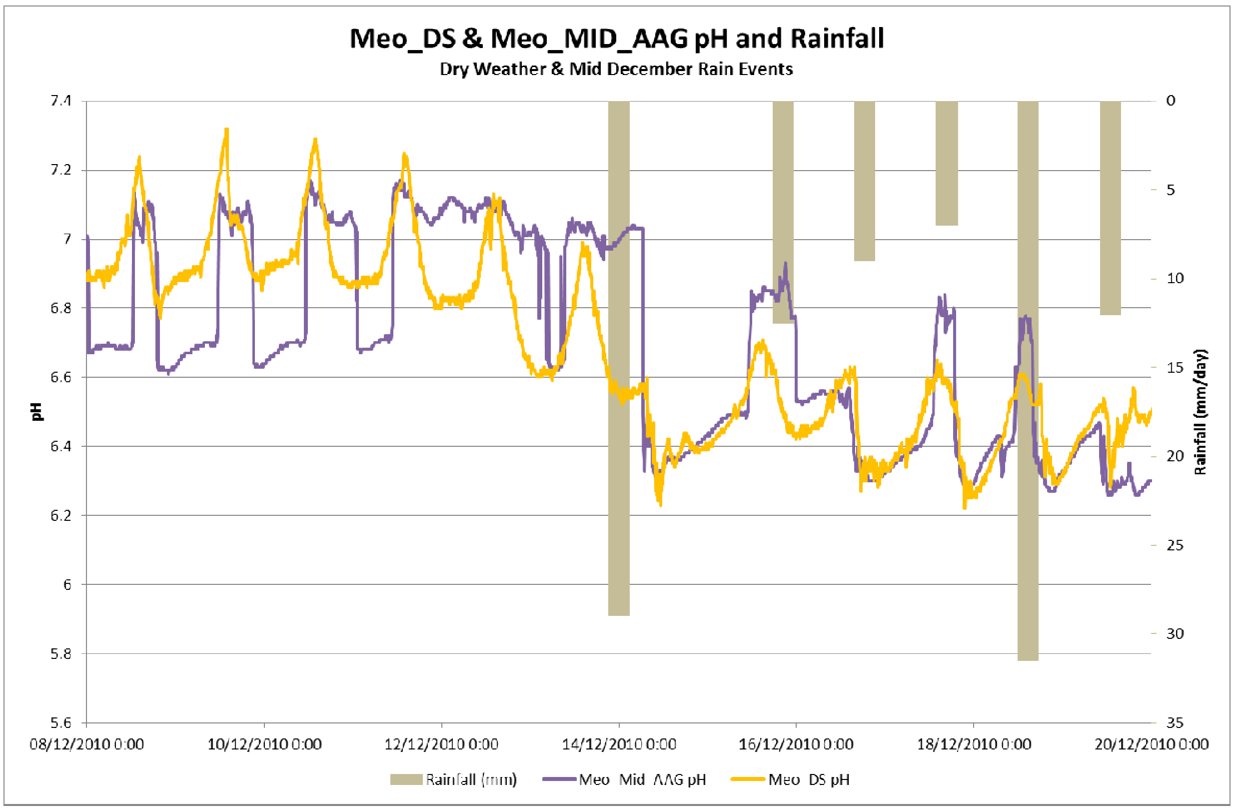


Figure 9: Comparison between Meo_MID_AAG and Meo_DS sites for pH over a dry period ending in a wet weather event. Note difference in diurnal variation patterns and the 'sag' following the wet weather event.

6.0 Baseline Monitoring Results

Three monthly baseline samples were taken from stream, harbour and marine sites on the following dates:

- 21st November 2010
- 24th December 2010
- 27th January 2011

These samples were taken between 9 and 10 am on the relevant day with a minimum of three days antecedent dry weather. The following sections include summarised results. A full database of results is included in Appendix C.

6.1 Total Suspended Solids (TSS) and Turbidity

Total suspended solids and turbidity were measured at all sites.

TSS at the freshwater sites ranged between 1.3 and 18 mg L^{-1} over the sampling period, while the marine sites ranges from 5.7 to 17 mg L^{-1}. TSS at the Meo_HB site ranged from 7.6 to 23 mg L^{-1}.

Turbidity values ranged from 1.29 to 7.17 NTU at the freshwater sites, 2.02 to 2.56 at the marine sites, and 4.88 to 12.1 NTU at the Meo_HB site.

There is a poor correlation between the TSS and turbidity values at any of the sites during baseline sampling.

Meo_DS and Meo_MID had the lowest TSS and turbidity results (average 2.71 mg L^{-1} and 2.71 NTU) due to the 'clean' groundwater inputs entering the stream in proximity to these sites.

As expected, during dry weather these values are low and do not indicate any significant issues affecting water quality or visual amenity. The mean turbidity range for the regional monitoring programme across all sites in 2009 was 4.6 to 31.5 NTU (Neale, 2010).

6.2 Total Petroleum Hydrocarbons (TPH)

Total petroleum hydrocarbons (TPH) were below detection limits (<0.30 mg L^{-1}) at all sites for all samples taken during baseline sampling.

6.3 Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD)

Biochemical oxygen demand (BOD) was <2.0 mg L^{-1} O at all sites except at Meo_US which had 3.2 mg L^{-1} O on the 29/11/2010.

Chemical oxygen demand (COD) could not be accurately measured at saline sites as indicated by Watercare Laboratory Services Ltd, salinity interferes with the test therefore the COD refers only to freshwater sites. A dry weather overflow (sewage discharged during dry weather conditions) was sampled in both December and January. This was located upstream of Meo_DS but downstream of both Meo_US and Meo_MID. A single house cross connection was discovered in the Meo_US catchment on 15th April 2011. This may have led to intermittent high loading as sampled in December.

Table 6: Chemical oxygen demand results for freshwater sites. COD is considered to be very high, as a comparison wastewater is typically within a range of 250-800 mg L^{-1} O.

Site	Meo_US			Meo_MID			Meo_DS		
Month	Nov	Dec	Jan	Nov	Dec	Jan	Nov	Dec	Jan
Chemical Oxygen Demand (mg L^{-1} O)	5.71	105	3.26	8.98	74	51	5.7	95	31

6.4 Nutrients

Ammonia nitrogen, soluble reactive phosphorous (SRP) and total kjeldahl nitrogen (TKN) were measured in baseline sampling. The mean ammonia nitrogen range for the regional monitoring programme across all sites in 2009 was 0.005 -0.087 mg L^{-1} N with one site experiencing a mean of 0.244 mg L^{-1} N. The mean SRP range for the regional monitoring programme across all sites in 2009 was 0.007 -0.05 mg L^{-1} N. The mean TKN range for the regional monitoring programme across all sites in 2009 was 0.06 -0.76 mg L^{-1} N with one site experiencing a mean of 1.45 mg L^{-1} N (Neale, 2010).

Table 7: Summarised nutrient results for freshwater sites only for the baseline sampling period.

	Site	Meo_US			Meo_MID			Meo_DS		
	Month	Nov	Dec	Jan	Nov	Dec	Jan	Nov	Dec	Jan
Parameter	Ammonia N mg L^{-1}	0.150	0.109	0.307	0.048	0.060	0.087	0.037	0.072	0.043
	TKN	0.380	0.440	0.720	0.390	0.220	0.660	0.340	0.280	0.400
	SRP	0.084	0.031	0.064	0.119	0.054	0.068	0.057	0.066	0.054

6.5 Metals

Zinc had the highest concentration at all sites and was present above the ANZEEC guideline value for ecosystem protection for slightly to moderately disturbed aquatic or freshwater ecosystems for 50% of samples (Table 8).

Anomalies in the relatively consistent results are the baseline samples taken at Meo_HB and PtChev4 on the 27 January 2011 (Figure 10). At these sites, there was a significant increase in the total arsenic, copper, nickel and zinc concentrations. There were three other sites located between the Meo_Hb and PtChev4 (i.e. PtChev1, 2 and 3) which did not show the same spike pattern. The reason for these anomalies is unknown; however, retired landfills in the Meola Reef area adjacent to these marine sites may provide intermittent metals loadings dependant on tidal/groundwater interactions and subsequent dilution.

The ANZECC (2000) trigger guideline (Table 8) applies initially to total metals only; however, if the metal value exceeds the trigger value, the guideline also includes soluble concentrations.

Table 8: Trigger values of key metal contaminants identified during baseline sampling for the protection of 95% of aquatic species (ANZECC, 2000).

Parameter	Freshwater (mg L^{-1})	Marine (mg L^{-1})
Zinc	0.008	0.015
Copper	0.0014	0.0013
Lead	0.0034	0.0044
Nickel	0.0011	0.007

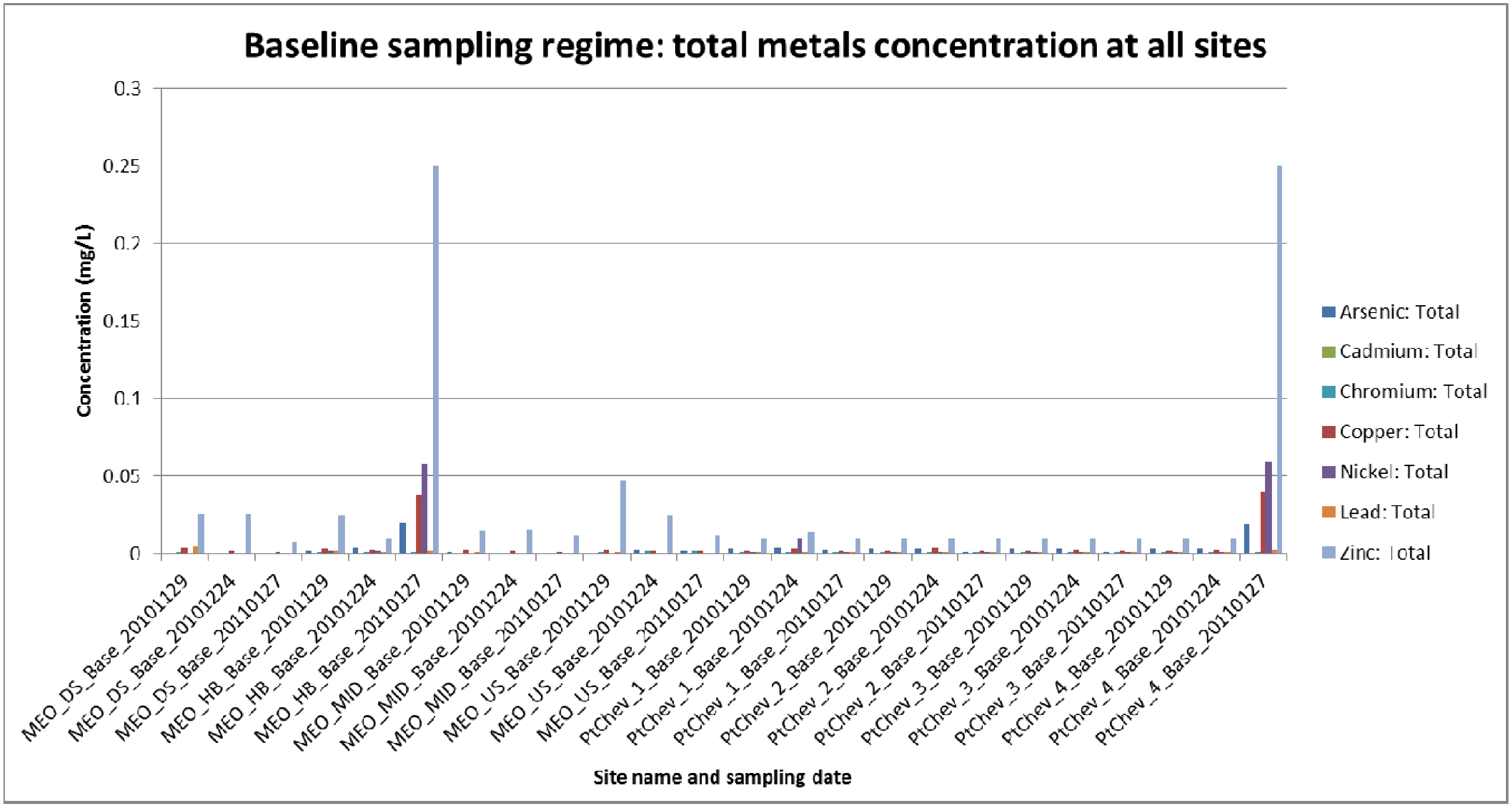


Figure 10: Total metal concentrations at all sites for all baseline sampling dates.

6.6 E.coli and Enterococci

E. coli concentrations at the freshwater receiving environment sites are included in Figure 11 in reference to the recreational contact guideline red alert level of 550cfu/100mL (MfE, 2003).

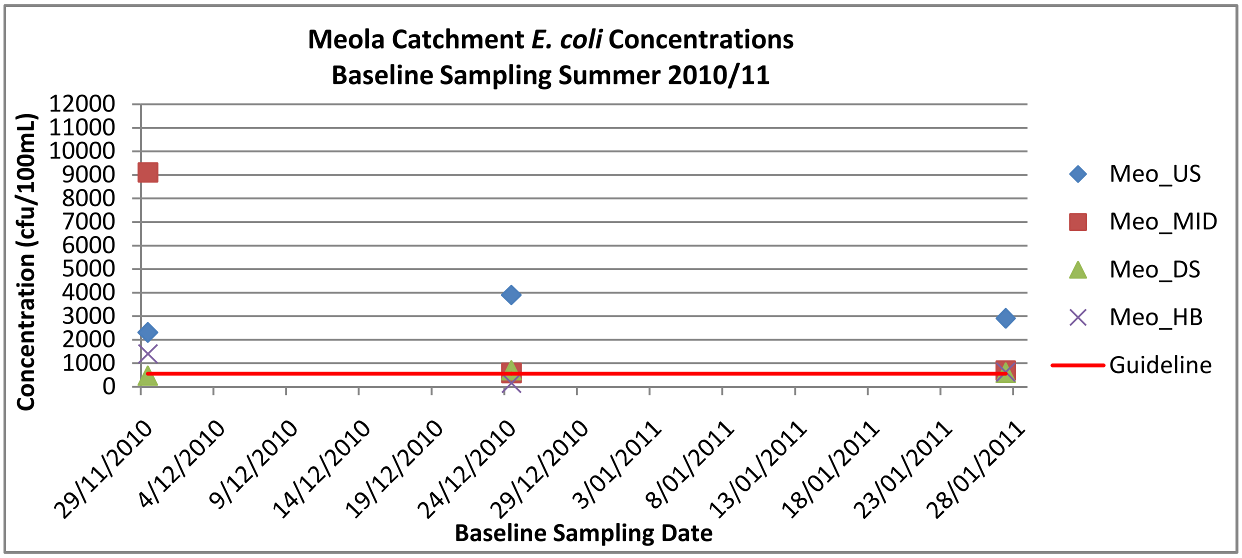


Figure 11: *E. coli* **concentrations throughout Meola Creek. During dry weather the Meo_US site typically had the highest concentration of** *E. coli.*

Enterococci did not exceed recreational contact guidelines in any of the marine baseline samples, except in November at Meo_HB. However, *E.coli* values exceeded guidelines at every sampling occasion at Meo_US and Meo_MID, in January at Meo_DS and in November and January at Meo_HB (Table 9).

Table 9: Summary of microbiology from baseline monitoring November 2010 - January 2011. NB highlighted cells are those exceeding the red-alert for the relevant recreational contact guidelines (*E. coli* = freshwater, Enterococci = marine) (MfE, 2003).

Site		Meo_US			Meo_MID			Meo_DS			Meo_HB		
Month		Nov	Dec	Jan	Nov	Dec	Jan	Nov	Dec	Jan	Nov	Dec	Jan
Parameter	E. coli (/100mL)	2300	3900	2900	9100	590	950	470	470	700	1400	153	620
	Enterococci (/100mL)	510	7270	12033	920	173	218	220	144	275	480	110	52
Site		Pt_Chev_1			Pt_Chev_2			Pt_Chev_3			Pt_Chev_4		
Month		Nov	Dec	Jan	Nov	Dec	Jan	Nov	Dec	Jan	Nov	Dec	Jan
Parameter	E. coli (/100mL)	<10	7	<2	<10	<2	<2	<10	<2	3	<10	<2	<2
	Enterococci (/100mL)	18	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

6.7 Norovirus and Campylobacter Results

Norovirus and campylobacter were tested for at Meo_DS, Pt_Chev_2 and Pt_Chev_4 during baseline monitoring (Table 10).

It is noted that on the occasions that norovirus was detected during baseline sampling a dry weather overflow was observed within the catchment.

Professor Gillian Lewis, of the University of Auckland, aided in interpretation of these results. Note that the norovirus numbers included in the table below are in log units. These indicate norovirus in the range of 100 – 600 norovirus genome copies per litre. It is prudent to assume that all of these noroviruses will be infectious. As such, quantities of this level provide a potential infectious dose of virus to recreational users of the environment.

Campylobacter was present in small amounts during all dry weather samples, but was not present or below the detection limit in the CSO, SW and DS wet weather samples (Table 10).

Table 10: Summarised norovirus (Log_{10} numbers) and campylobacter (numbers) results including quantitation where available. Positive results are highlighted in blue. NB: BLOQ = below level of quantitation.

Regime	MEL Sample Identification	NoV GI		NoV GII		Campylobacter
		Result	genome copies log_{10}/L	Result	genome copies log_{10}/L	MPN/L
Baseline	Meo_DS_Base_20101201	neg	neg	neg	neg	2
	PtChev2_Base_20101129	neg	neg	neg	neg	N/A
	PtChev4_Base_20101129	neg	neg	neg	neg	N/A
	Meo_DS_Base_20101224	pos	BLOQ <2.1	pos	BLOQ <2.1	5
	PtChev2_Base_20101224	neg	neg	pos	BLOQ <2.1	N/A
	PtChev4_Base_20101224	neg	neg	neg	neg	N/A
	Meo_DS_Base_20110127	pos	2	pos	2.4	4.1
	PtChev2_Base_20110127	neg	neg	neg	neg	N/A
	PtChev4_Base_20110127	neg	neg	neg	neg	N/A
Wet Weather 1	Meo_SW_WW1_000	neg	neg	neg	neg	neg
	Meo_SW_WW1_010	neg	neg	neg	neg	neg
	Meo_CSO_WW1_000	pos	BLOQ <2.2	pos	BLOQ <2.2	neg
	Meo_CSO_WW1_010	pos	BLOQ <2.8	pos	BLOQ <2.8	neg
	Meo_DS_WW1_030	pos	BLOQ <1.9	pos	BLOQ <1.9	neg
	Meo_DS_WW1_060	pos	BLOQ <2.0	pos	2.8	neg
	PtChev2_WW1_C	neg	neg	neg	neg	N/A
	PtChev2_WW1_D	neg	neg	neg	neg	N/A
	PtChev4_WW1_C	neg	neg	neg	neg	N/A
	PtChev4_WW1_D	neg	neg	neg	neg	N/A
Wet Weather 2	Meo_SW_WW2_000	neg	neg	neg	neg	neg
	Meo_SW_WW2_010	neg	neg	neg	negs	neg
	Meo_CSO_WW2_000	neg	neg	pos	BLOQ <1.9	neg
	Meo_CSO_WW2_010	neg	neg	neg	neg	neg
	Meo_DS_WW2_030	pos	BLOQ <1.9	neg	neg	neg
	Meo_DS_WW2_060	pos	BLOQ <1.9	neg	neg	neg
	PtChev2_WW2_B	neg	neg	neg	neg	N/A
	PtChev2_WW2_C	neg	neg	neg	neg	N/A
	PtChev4_WW2_B	neg	neg	neg	neg	N/A
	PtChev4_WW2_C	neg	neg	neg	neg	N/A

6.8 Biofilm

This section provides a summary of the biofilm report delivered by Dr Vidya Washington and Professor Gillian Lewis of the University of Auckland. The full reporting output is included in Appendix D: Biofilm Report.

The findings from the samples are detailed as follows:

- Upstream and downstream samples show differences on both sampling occasions.
- BCI values suggest that Meola Creek had mid-range stream health; with the downstream site showing higher scores (i.e. less-impacted) than the upstream site, refer Table 11.
- There are significant difference in BCP and slight increases in BCI between November 2010 and January 2011 sampling times.
- BCI results suggest Meola Creek is of mid-range ecosystem quality comparable with rural streams, significantly higher quality than some other urban streams.

Preliminary results for the four SEV assessments that have been undertaken between April and June 2011 confirm the pattern of increasing ecological health/value from upstream to downstream. This is particularly clear in the Habitat Provision and Biodiversity Scores of the SEV assessments. (Coup, 2011).

Table 11: BCI results for Meola Creek and other sites for comparison. The higher the BCI score, the less impacted the waterway. Note: Meola Upstream Oct 2010 (trial) is taken from a different site than the Nov 2010 and Jan 2011 Meola Upstream sites and is likely to have different inputs. Reproduced from University of Auckland Biofilm report included in Appendix D: Biofilm Report.

Site name	Code	BCI
Meola Upstream (Nov 2010)	Meola U/s (Nov 2010)	8.99
Meola Downstream (Nov 2010)	Meola D/s (Nov 2010)	9.17
Meola Upstream (Jan 2011)	Meola U/s (Jan 2011)	10.06
Meola Downstream (Jan 2011)	Meola D/s (Jan 2011)	10.76
Meola Upstream Oct 2010 (trial)	Meola U/s (Oct 2010)	9.71
Meola downstream Oct 2010 (trial)	Meola D/s (Oct 2010)	10.01
Puhinui LTB	PHN	6.18
Papakura	PP	6.44
Otara	OTR	6.49
Okura Reserve	OR	10.11
Shakespear	SH	10.19
Nukumea	NKU	10.39
Mangatawhiri	MTW	13.74
Konini	KN	13.96
Marawhara	MW	14.27

6.8.1 Biofilm Metals

Like sediment, biofilm is used as an indicator of the long term metals content of the stream. For comparability, the Interim Sediment Quality Guidelines (ISQG; ANZECC, 2000) are included in Table 12. Zinc is the metal of most concern being present at up to 20 times the trigger value at the two sites (Table 12). There is a notable difference between the two sample months in zinc concentration at both sites where the concentration decreased from 1200 mg L^{-1} to 280 mg L^{-1} (Meo_DS_BF) and 4000 to 2900 (Meo_US) (Table 12). This may be as a result of seasonal variation or the reduced time between sampling removal of biofilm as a similar trend was exhibited at both sites.

Table 12: Metal concentrations in biofilm samples at Meo_US and Meo_DS_BF on two occasions, 29th November 2010 and 27th January 2011. Highlighted cells indicate results which exceed the ANZECC (2000) Interim Sediment Quality Guidelines (ISQG) trigger value.

		Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
ISQG – Low (Trigger value)		20	1.5	80	65	21	50	200
Site	Date							
Meo_US	29/11/2010	47	2.9	81	180	70	230	4000
Meo_DS_BF	29/11/2010	13	0.91	37	45	30	33	1200
Meo_US	27/01/2011	95	2	140	180	60	200	2900
Meo_DS_BF	27/01/2011	8.7	0.26	44	26	11	25	280

6.9 Observed Discharges

The baseline monitoring included a survey of outfalls along the stream length to determine any unusual discharges that may affect results. Samples were taken where a discharge was discovered. Full results are included in Appendix C: Results Database.

November

- No dry weather discharges were observed during the November baseline sampling round.

December

- A sample was collected from within channel in Roy Clements Treeway immediately downstream of the Haverstock outfall on 01/12/2010 due to discolouration of water. Testing revealed elevated *E. coli* (1280 cfu/100mL) and Enterococci (1480 cfu/100mL) (Sample ID: Meo_SS_20100121).
- A dry weather overflow recorded from outfall of pipe (Metrowater Asset ID NS3390) within Chamberlain Park Golf Course on 24/12/2010 (Sample ID: Meo_OF_Base_20101224). Testing revealed elevated *E. coli* (1,240,000 cfu/100mL) and Enterococci (>24196 MPN/100mL) results. BOD and COD were also elevated (220 mg L^{-1} O and 425 mg L^{-1} O, respectively) and results were reported to Watercare. Sampling results revealed Norovirus present at the Meo_DS site and PtChev2.

January

- Dry weather overflow recorded from same outfall of pipe (Metrowater Asset ID NS3390) within Chamberlain Park Golf Course on 27/01/2011 (Sample ID: Meo_OF_Base_20110127). Testing revealed elevated *E. coli* (3,800,000 cfu/100mL) and Enterococci (241,960 MPN/100mL). BOD and COD were also elevated (125 mg L^{-1} O and 285 mg L^{-1} O respectively) and results were reported to Watercare. Follow-up communications resulted in flushing of the public wastewater network to clear a blockage.
- Sediment discharge observed and reported to Pollution Hotline at Mt Albert Grammar School (Sample ID: Meo_OF_RCT20110127).

7.0 Wet Weather Monitoring Results

This section of the report contains summarised results obtained from two wet weather events on 28th January and 16th April 2011. The results obtained from the wet weather sampling are somewhat complex with two events, nine sites, six sampling times and more than 20 parameters.

As such, six parameters have been reported in detail, including total zinc, total suspended solids, *E. coli*, Enterococci, norovirus and particle size distribution. Results of the other parameters tested can be found in Appendix C: Results Database.

7.1 Event Details

Two wet weather events were captured between November 2010 and May 2011, one on the 28/01/2011 and one on the 14/04/2011 (Table 13, Figure 12).

Table 13: Wet weather characteristics for events on the 28/01/2011 and 16/04/11.

	Wet Weather Event 1 (WW1)	Wet Weather Event 2 (WW2)
Date	28-01-2011	16-04-2011
Antecedent dry period	3 days	8 days
Peak Rainfall Intensity	12 mm hr^{-1} between 1:00 am and 2:00 am 29-01-2011 (after sampling)	1.7mm/10mins The peak intensity prior to CSO overflowing was 1mm/10minutes at 8:30am.
Rainfall prior to overflow	7.5 mm of rain had fallen in the 3.5 hours prior to the CSO overflowing	3.5 mm of rain had fallen in the 1hr 20 minutes prior to the CSO overflowing.
CSO Overflow Time and Duration	5:50 pm, overflowed for 110 minutes.	8:55 am, overflowed for 50 minutes.
Marine Sampling Times	Marine sampling at Pt Chevalier started at 8:45 pm 28-01-2011 to coincide with tides and was completed by 12:26 am 29-01-2011.	Marine sampling at Pt Chevalier started at 11:50 am 16/04/2011 to coincide with tides and was completed by 3:30 pm 16/04/2011.
Additional Comments	A second larger overflow was observed after 8pm; however this was not sampled at the Meo_CSO site.	A second larger overflow was observed after 11:20am; however this was not sampled at the Meo_CSO site.

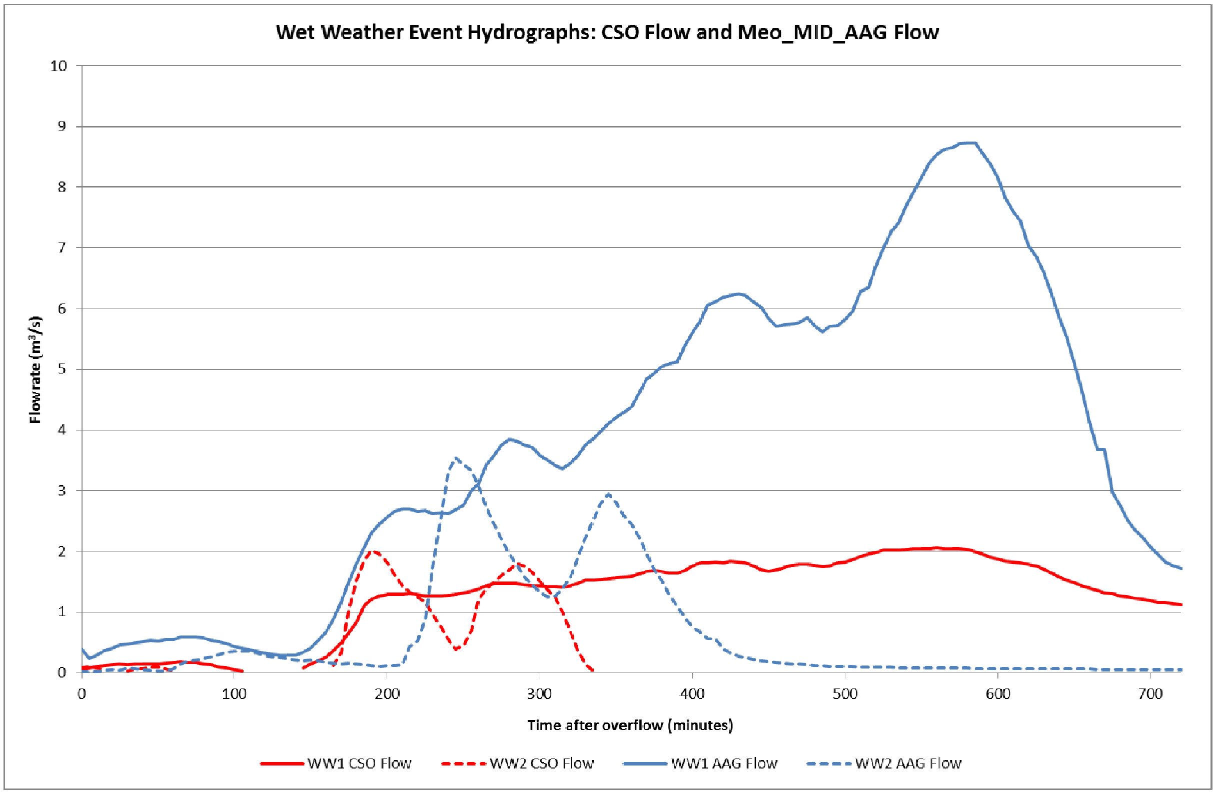


Figure 12: Hydrograph for two wet weather events at Lyons Ave CSO and Meo_MID_AAG

7.2 Wet Weather Event 1

Key observations and selected graphed results from the wet weather sampling are detailed below. Discussions are included in Section 7 Discussion.

7.2.1 Public Health Risk Indicators

The following graphs show the public health risk indicators for both the catchment discharges (Figure 13, Table 14), stream receiving environment sites (Figure 14, Table 14) and marine sites (Figure 15).

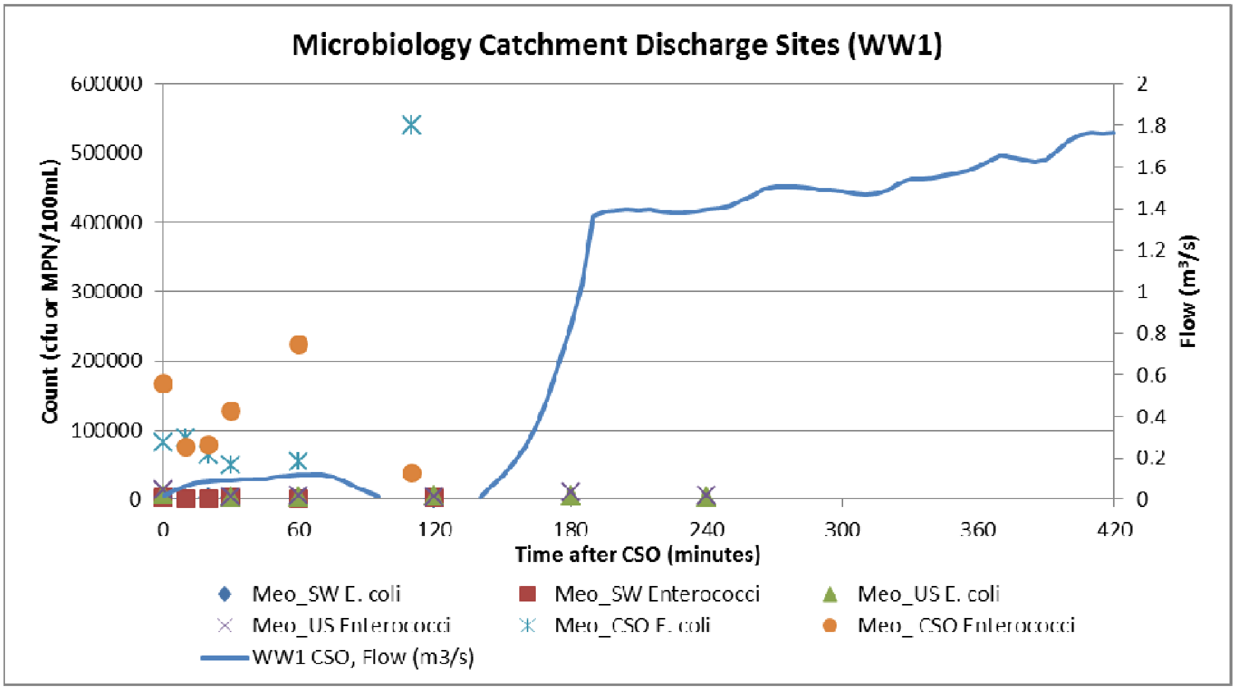


Figure 13: Enterococci and *E. coli* results from the catchment discharge sites across the sample period for WW1.

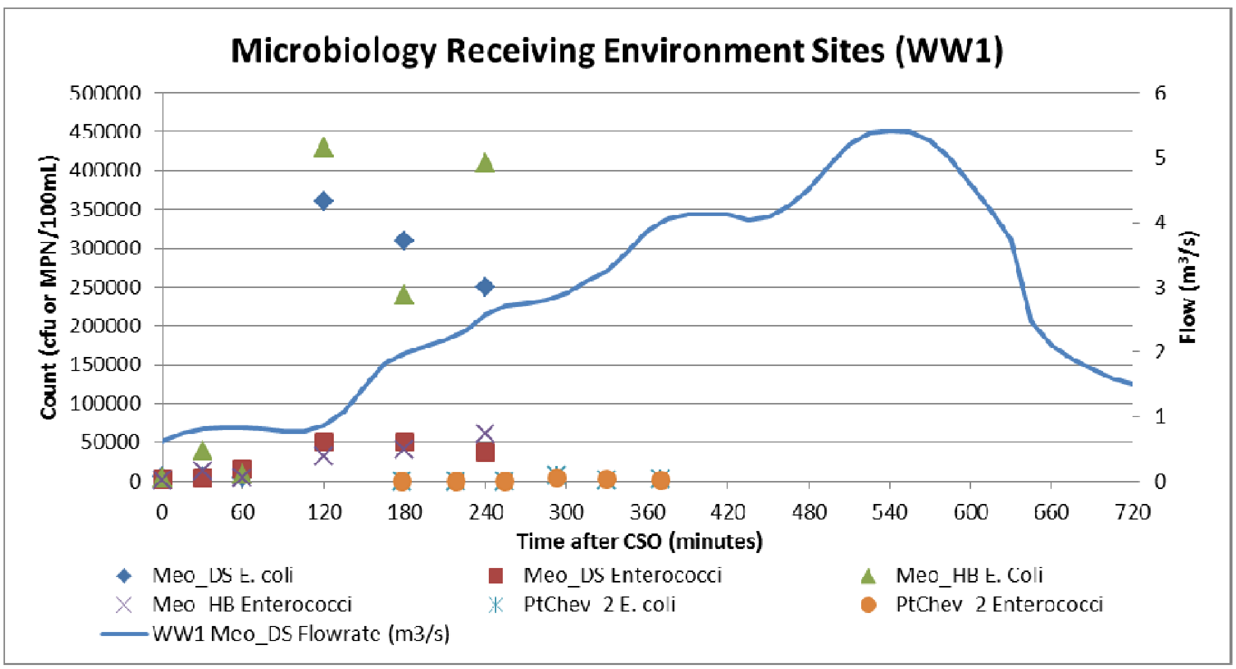


Figure 14: Enterococci and *E. coli* results at receiving environment sites across the sample period for WW1 (nb: PtChev2 represents the marine sites).

Table 14: Public health indicators at catchment discharge and freshwater sites for Wet Weather Event 1.

Site Name	Time after CSO Minutes	*E. coli* (cfu/100mL)	Enterococci (MPN/100mL)	Campylobacter (MPN/L)	Noroviruses by PCR			
					NoV GI		NoV GII	
	0	82000	166400	< 1 MPN/L	pos	BLOQ <2.2	pos	BLOQ <2.2
	10	88000	75400	< 1 MPN/L	pos	BLOQ <2.8	pos	BLOQ <2.8
	20	64000	79400					
	30	50000	127400					
	60	54000	224700					
Meo_CSO	120	540000	37900					
	0	5600	2098					
	30	6000	3873	< 1 MPN/L	pos	BLOQ <1.9	pos	BLOQ <1.9
	60	3500	15531	< 1 MPN/L	pos	BLOQ <2.0	pos	2.8
	120	360000	51200					
	180	310000	51200					
Meo_DS	240	250000	37900					
	0	3600	1935					
	30	39000	12997					
	60	9000	4611					
	120	430000	31500					
	180	240000	40800					
Meo_HB	240	410000	61300					
	0	2600	1723	< 1 MPN/L	Negative	Negative	Negative	Negative
	10	1600	932	< 1 MPN/L	Negative	Negative	Negative	Negative
	20	2700	1376					
	30	2400	2247					
	60	1400	1234					
Meo_SW	120	1500	1850					
	0	6700	14136					
	30	4000	3448					
	60	4800	5475					
	120	4900	3255					
	180	5300	9804					
Meo_US	240	4100	5172					

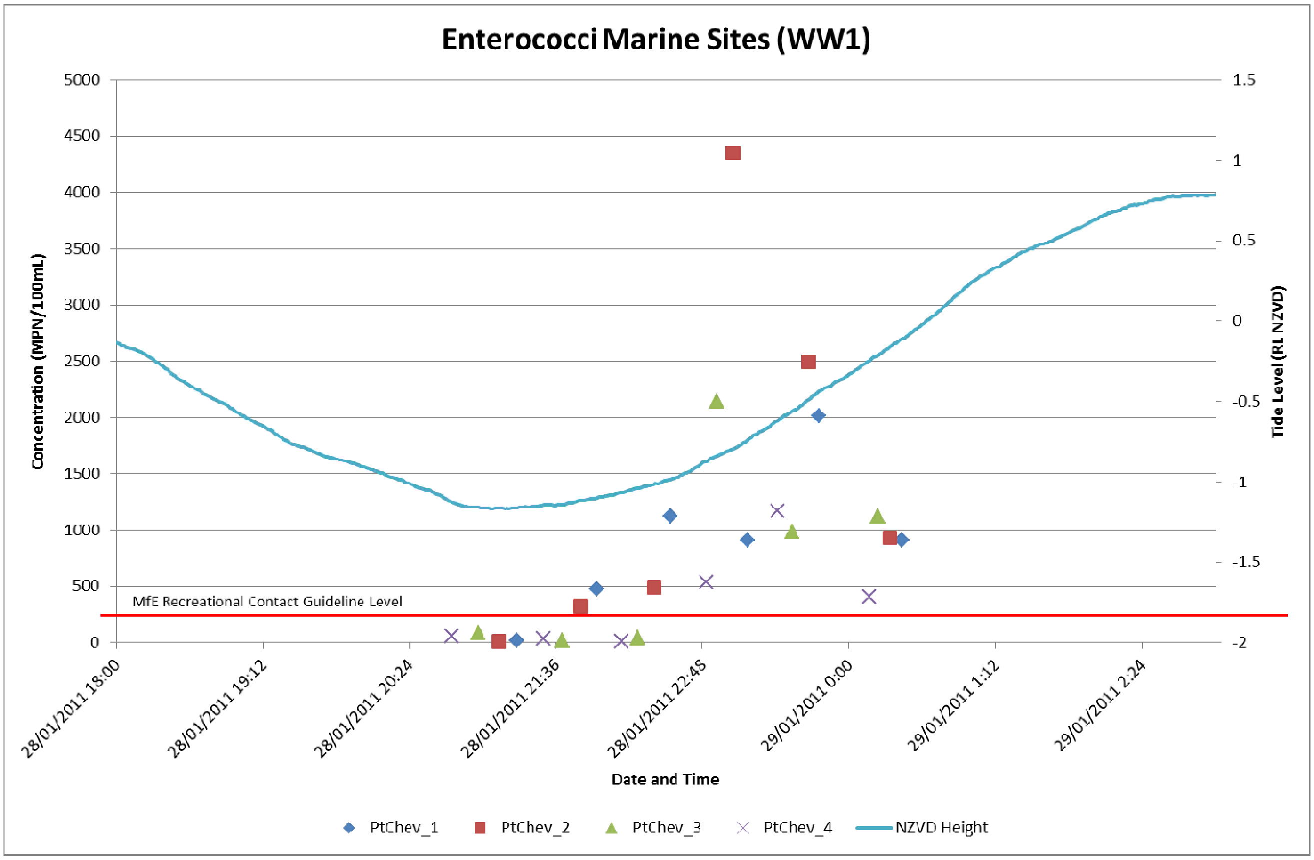


Figure 15: Enterococci concentration across four marine sites during WW1 in relation to tide (NZVD). The red line indicates MfE recreational contact level guidelines for enterococci (280 MPN/100mL).

7.2.2 Contaminant Loads

The following section indicates contaminant load patterns of Wet Weather Event 1 as indicated by TSS and zinc concentrations. Typical wastewater and stormwater contaminants are also included in Table 15.

The following graphs show the TSS concentration of Wet Weather Event 1 for both the catchment discharges Figure 25 and stream receiving environment sites (Figure 26).

Zinc concentrations for Wet Weather Event 1 are also included for both the catchment discharges (Figure 27) and stream receiving environment sites (Figure 28).

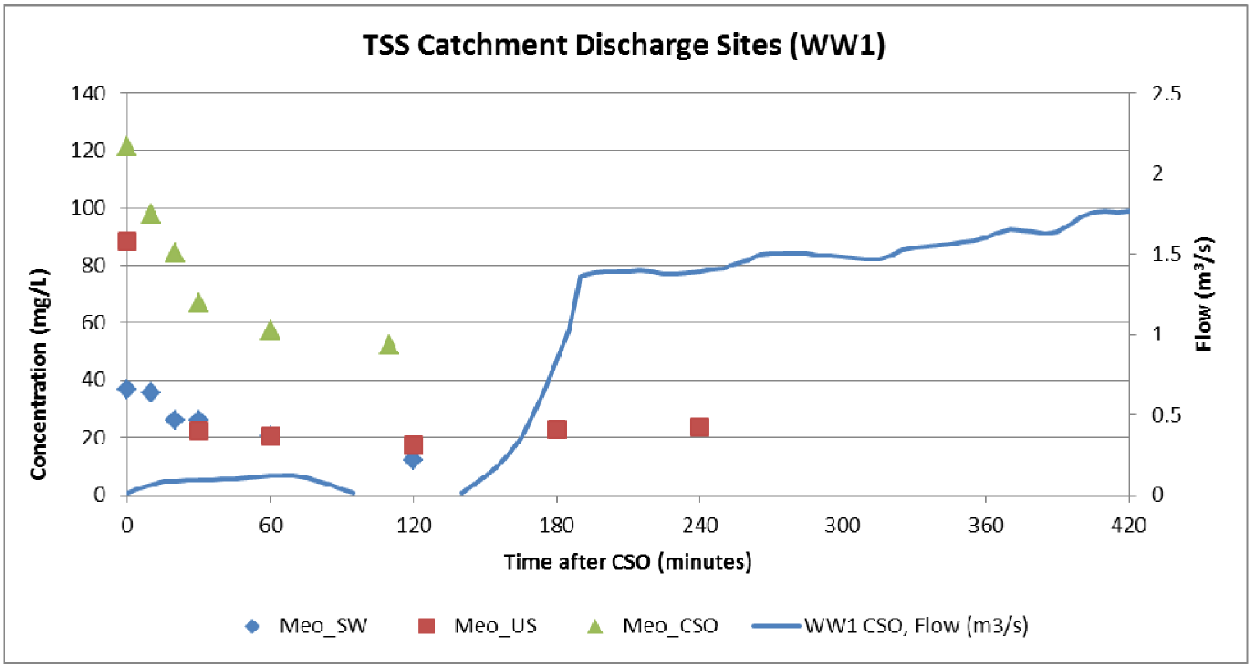


Figure 16: Total suspended solids (TSS) from the catchment discharge sites across the sample period for WW1. Residual flow from CSO occurred at t=120.

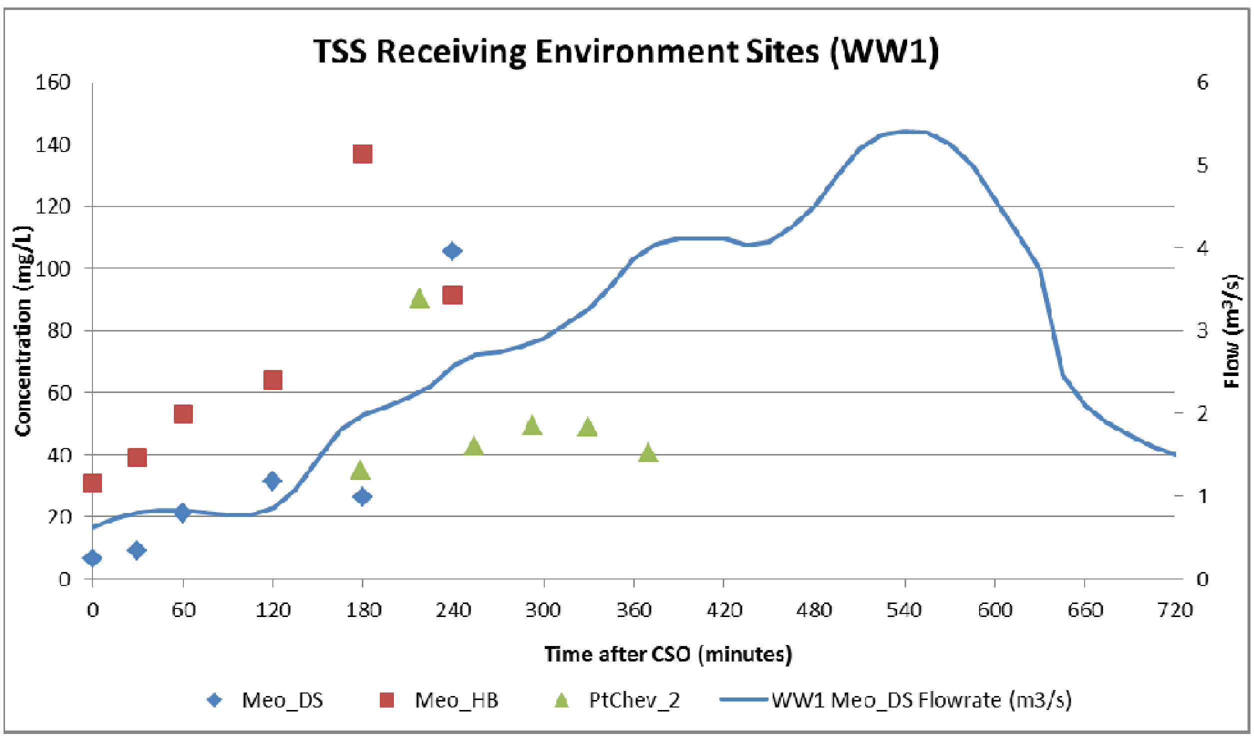


Figure 17: Total suspended solids (TSS) from the receiving environment sites across the sample period for WW1 (PtChev2 has been chosen to represent the marine sites).

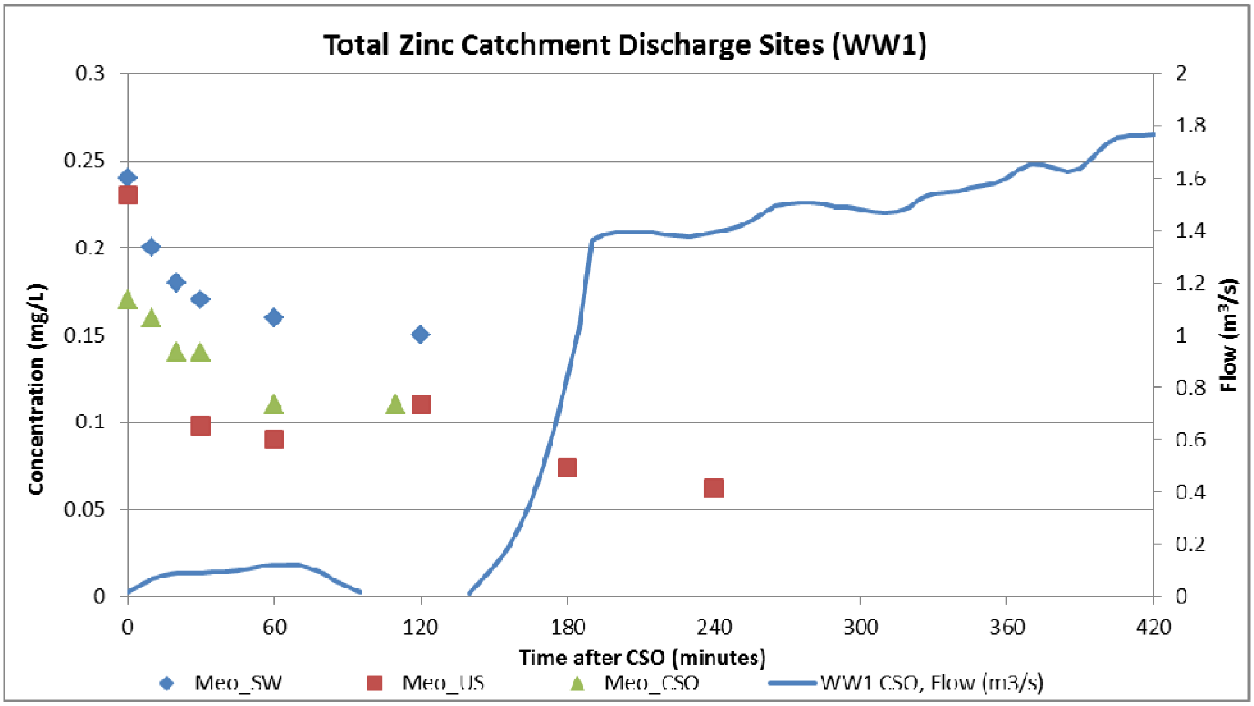


Figure 18: Total zinc concentration from the catchment discharge sites across the sample period for WW1. Residual flow from CSO occurred at t=120.

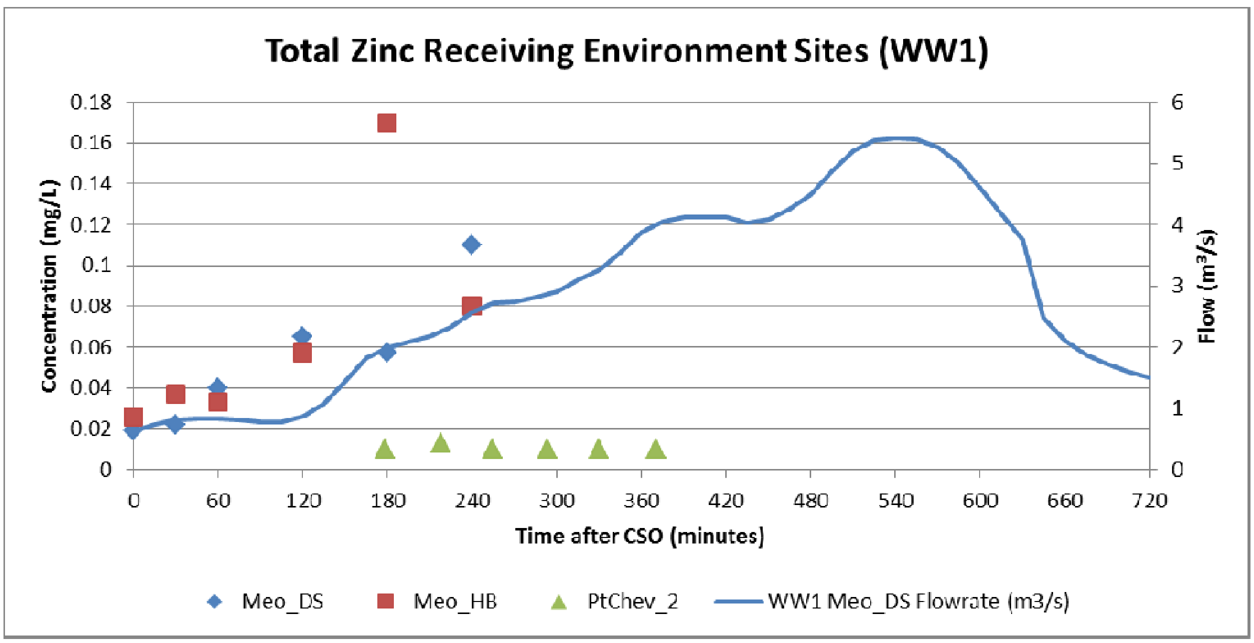


Figure 19: Total zinc concentration from the receiving environment sites across the sample period for WW1 (nb: PtChev2 has been chosen to represent the marine sites).

Table 15: Water quality parameters at all sites during Wet Weather Event 1. Note: Peak values are highlighted in blue. PtChev2 has been chosen to represent marine sites.

Site Name	Time After CSO	TSS	VSS	TPH	Soluble Copper	Total Copper	Soluble Lead	Total Lead	Soluble Zinc	Total Zinc	BOD	Ammonia Nitrogen	Soluble Reactive Phosphorous	TKN
	Minutes	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}O	mg L^{-1}N	mg L^{-1}P	mg L^{-1}N
Meo_CSO	0	**121**	**98**	**0.81**	**0.0047**	**0.044**	**0.00057**	**0.01**	**0.065**	**0.17**	**87.0**	2.7	**0.416**	8.10
	10	98	76	< 0.30	0.0035	0.021	0.00047	0.0082	0.062	0.16	60.0	**2.8**	0.374	**8.11**
	20	84	67	< 0.30	0.0023	0.016	0.00031	0.0076	0.053	0.14	55.0	2.3	0.302	7.12
	30	67	54	< 0.30	0.0032	0.016	0.00046	0.0072	0.056	0.14	50.0	2.3	0.303	6.68
	60	57	49	< 0.30	0.0025	0.011	0.00031	0.0049	0.055	0.11	57.0	2.1	0.298	5.84
	120	52	45	< 0.30	0.0036	0.01	0.00051	0.0038	0.061	0.11	60.0	2.3	0.234	6.07
Meo_SW	0	**37**	**17**	< 0.30	**0.014**	**0.027**	**0.00061**	**0.0077**	**0.14**	**0.24**	4.4	**0.119**	0.022	0.74
	10	36	16	< 0.30	0.012	0.024	0.00045	0.006	0.13	0.2	**4.5**	0.105	0.028	0.80
	20	26	12	< 0.30	0.012	0.022	0.00054	0.0055	0.12	0.18	3.4	0.106	**0.032**	0.66
	30	26	12	< 0.30	0.011	0.021	0.0004	0.005	0.11	0.17	3.8	0.106	0.025	**1.09**
	60	20	10	< 0.30	0.0096	0.017	0.00051	0.0035	0.11	0.16	3.0	0.089	0.026	0.47
	120	12	7	< 0.30	0.011	0.018	0.00048	0.0022	0.11	0.15	< 2.0	0.079	0.028	0.36
Meo_US	0	**88**	**54**	< 0.30	**0.0049**	**0.027**	**0.00098**	**0.019**	0.056	0.23	**10.0**	**0.409**	**0.061**	**5.36**
	30	22	15	< 0.30	0.003	0.008	0.00047	0.0045	0.06	0.098	3.4	0.14	0.026	1.45
	60	21	12	< 0.30	0.0026	0.006	0.00044	0.0029	0.065	0.09	3.3	0.092	0.026	0.36
	120	17	10	< 0.30	0.0021	0.0044	0.00028	0.0015	**0.082**	**0.11**	3.2	0.056	0.027	0.53
	180	23	12	< 0.30	0.0012	0.0046	0.00029	0.0042	0.042	0.074	< 2.0	0.065	0.018	0.30
	240	24	17	< 0.30	0.0021	0.0044	0.00033	0.0022	0.049	0.062	< 2.0	0.128	0.017	0.20
Meo_DS	0	7	5	< 0.30	0.0014	0.0047	0.00022	0.0012	0.013	0.019	2.2	0.08	0.063	0.45
	30	9	6	< 0.30	0.0019	0.0043	0.0003	0.0019	0.015	0.022	2.2	0.088	0.069	0.49
	60	21	8	< 0.30	0.0033	0.0078	**0.00041**	0.0044	0.02	0.04	4.0	0.124	0.065	0.78
	120	31	13	< 0.30	**0.0034**	0.0094	0.00034	0.0051	0.031	0.065	11.0	**1.4**	0.13	**2.70**
	180	26	13	< 0.30	0.003	0.0073	0.00036	0.0034	**0.032**	0.057	12.0	1.3	**0.165**	2.24
	240	**106**	**43**	< 0.30	0.002	**0.012**	0.00033	**0.015**	**0.032**	**0.11**	**18.0**	0.62	0.111	2.37

	Minutes	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}	mg L^{-1}O	mg L^{-1}N	mg L^{-1}P	mg L^{-1}N
Meo_HB	0	31	9	< 0.30	< 0.002	0.0023	< 0.001	0.0022	0.019	0.026	< 2.0	0.082	0.045	0.74
	30	39	10	< 0.30	< 0.002	0.0032	< 0.001	0.0034	0.025	0.037	< 2.0	0.082	0.052	0.94
	60	53	11	< 0.30	< 0.002	0.0036	< 0.001	0.0042	0.02	0.033	< 2.0	0.089	0.052	0.53
	120	64	19	< 0.30	< 0.002	**0.0089**	< 0.001	0.0088	**0.028**	0.057	10.1	0.543	0.13	2.49
	180	**137**	**41**	< 0.30	< 0.002	0.01	< 0.001	0.011	0.026	**0.17**	**22.0**	0.728	**0.16**	2.394
	240	92	31	< 0.30	< 0.002	0.011	< 0.001	**0.013**	**0.028**	0.08	12.0	**1.270**	0.13	**2.75**
PtChev 2	A	35	10	< 0.30	< 0.002	< 0.002	< 0.001	< 0.00099	< 0.01	< 0.0099		< 0.005	0.014	**0.038**
	B	**91**	**14**	< 0.30	< 0.002	< 0.002	< 0.001	**0.0014**	< 0.01	**0.013**		< 0.005	**0.028**	
	C	43	10	< 0.30	< 0.002	< 0.002	< 0.001	< 0.00099	< 0.01	< 0.0099		< 0.005	0.016	0.005
	D	50	11	< 0.30	< 0.002	< 0.002	< 0.001	< 0.00099	< 0.01	< 0.0099		< 0.005	0.018	0.018
	E	49	10	< 0.30	< 0.002	< 0.002	< 0.001	< 0.00099	< 0.01	< 0.0099		**0.011**	0.016	0.012
	F	41	9	< 0.30	< 0.002	< 0.002	< 0.001	< 0.00099	< 0.01	< 0.0099		< 0.005	0.015	0.011

7.2.3 Particle Size Distribution (PSD)

The following section indicates the PSD of Wet Weather Event 1 as indicated by the Meo_CSO catchment discharge site (Figure 20) and an average for each site (Figure 21). The graphs below relate to percentage of TSS volume smaller than the given size.

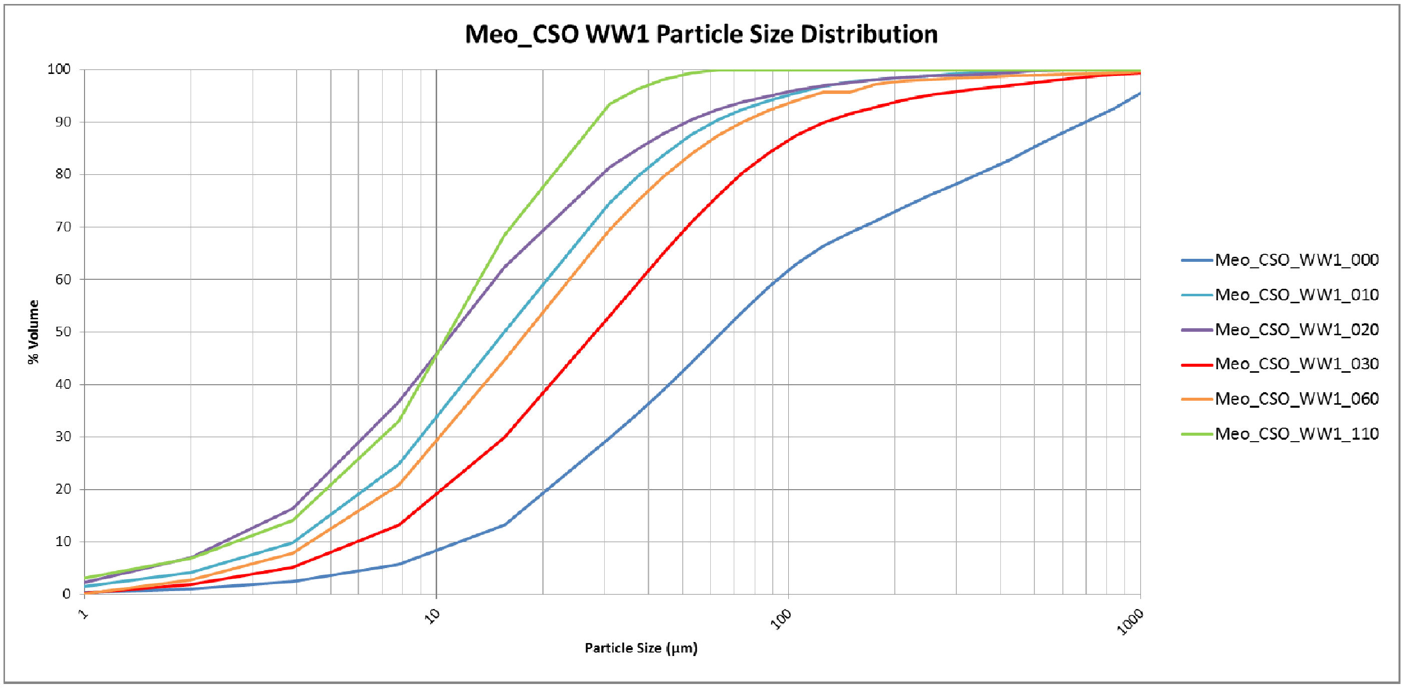


Figure 20: Particle size distribution for the Meo_CSO site over a 110 minute period during CSO overflow on 28-01-2011, where the 3-digit number at the end of the sample name indicates the time in minutes after overflow began.

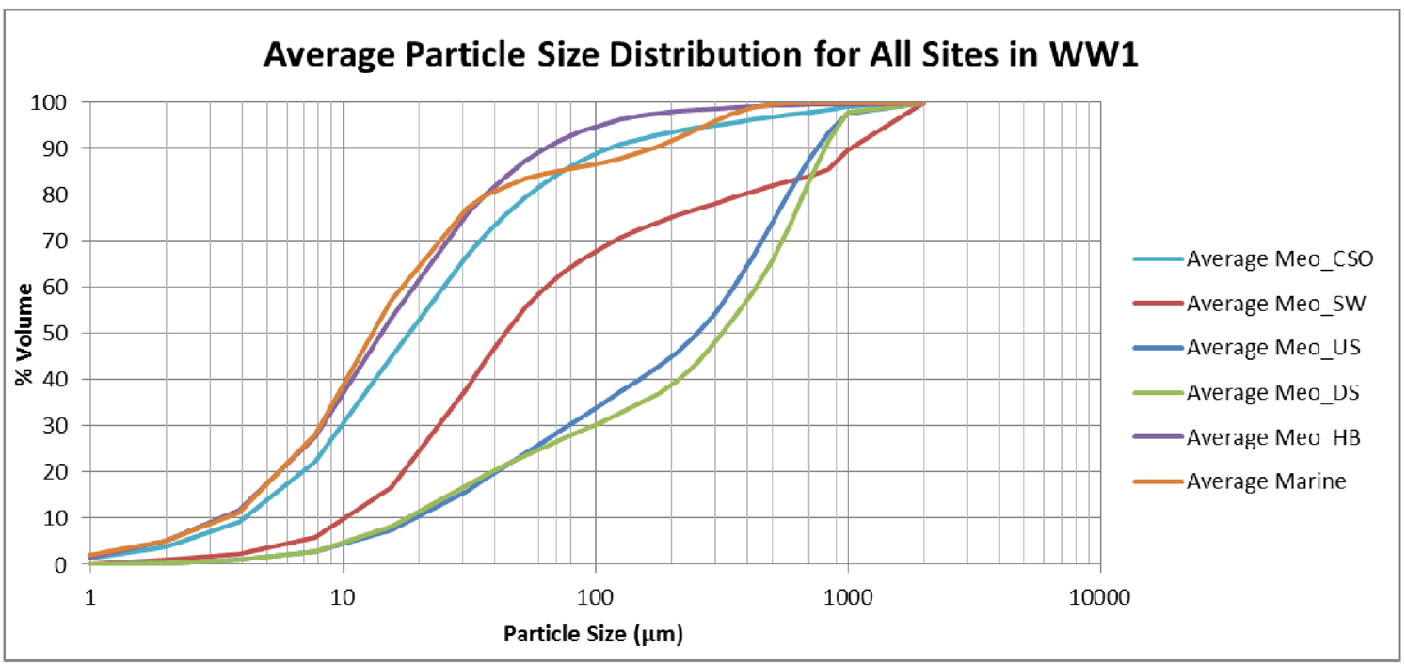


Figure 21: Average particle size distribution for each of the sites sampled for WW1 (Note: PtChev1-4 have been averaged together to produce the Average Marine data).

7.3 Wet Weather Event 2

7.3.1 Public Health

The following graphs show the public health risk indicators for both the catchment discharges (Figure 22, Table 16) stream receiving environment sites (Figure 23, Table 16) and marine sites (Figure 24).

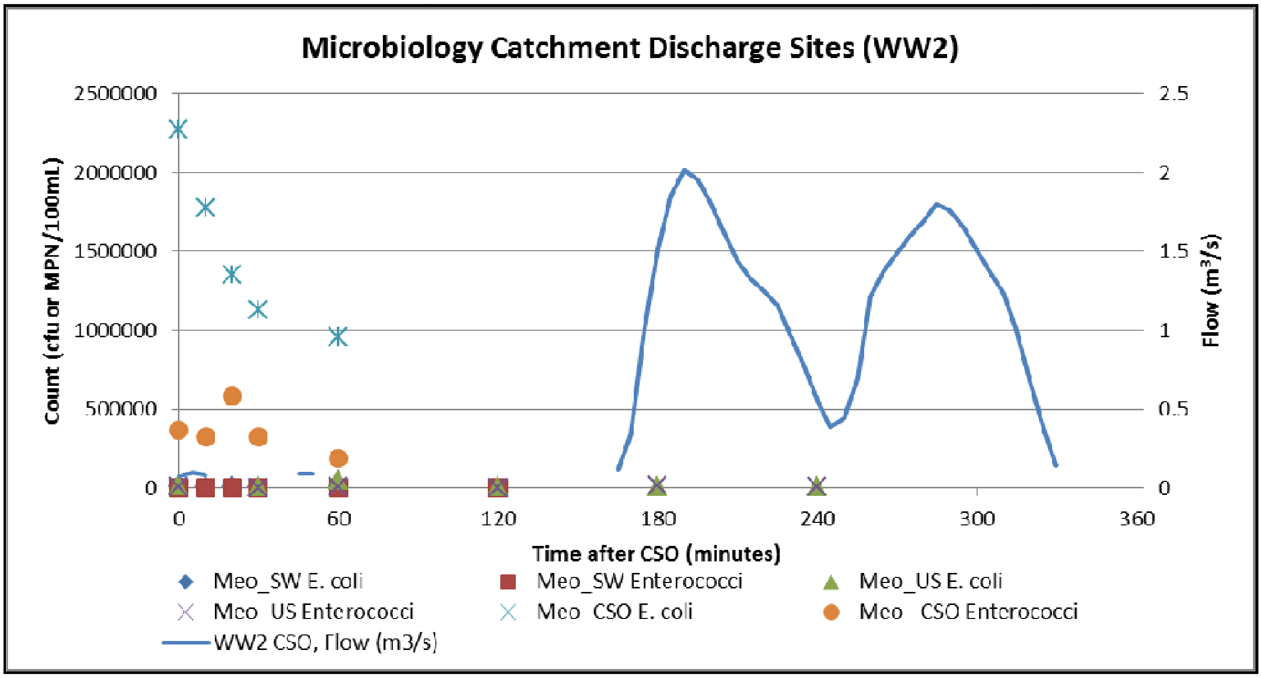


Figure 22: Enterococci and *E. coli* results from three catchment discharge sites across the sample period for WW2.

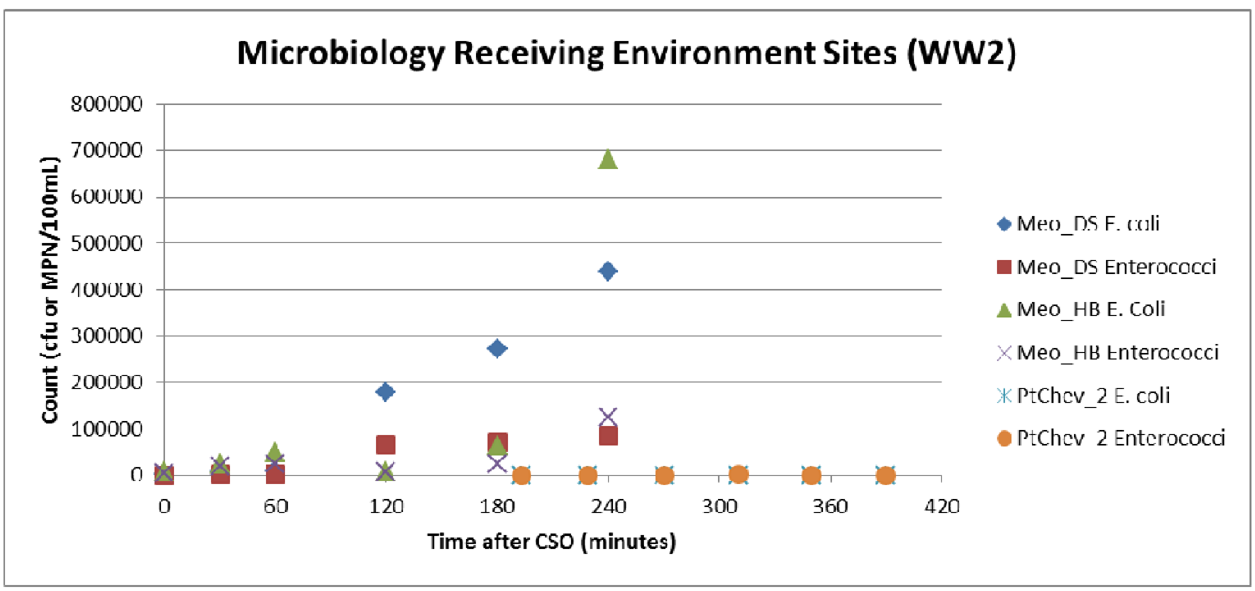


Figure 23: Enterococci and *E. coli* results from two receiving environment sites and one marine site across the sample period for WW2 (Note: PtChev2 has been chosen to represent the marine sites).

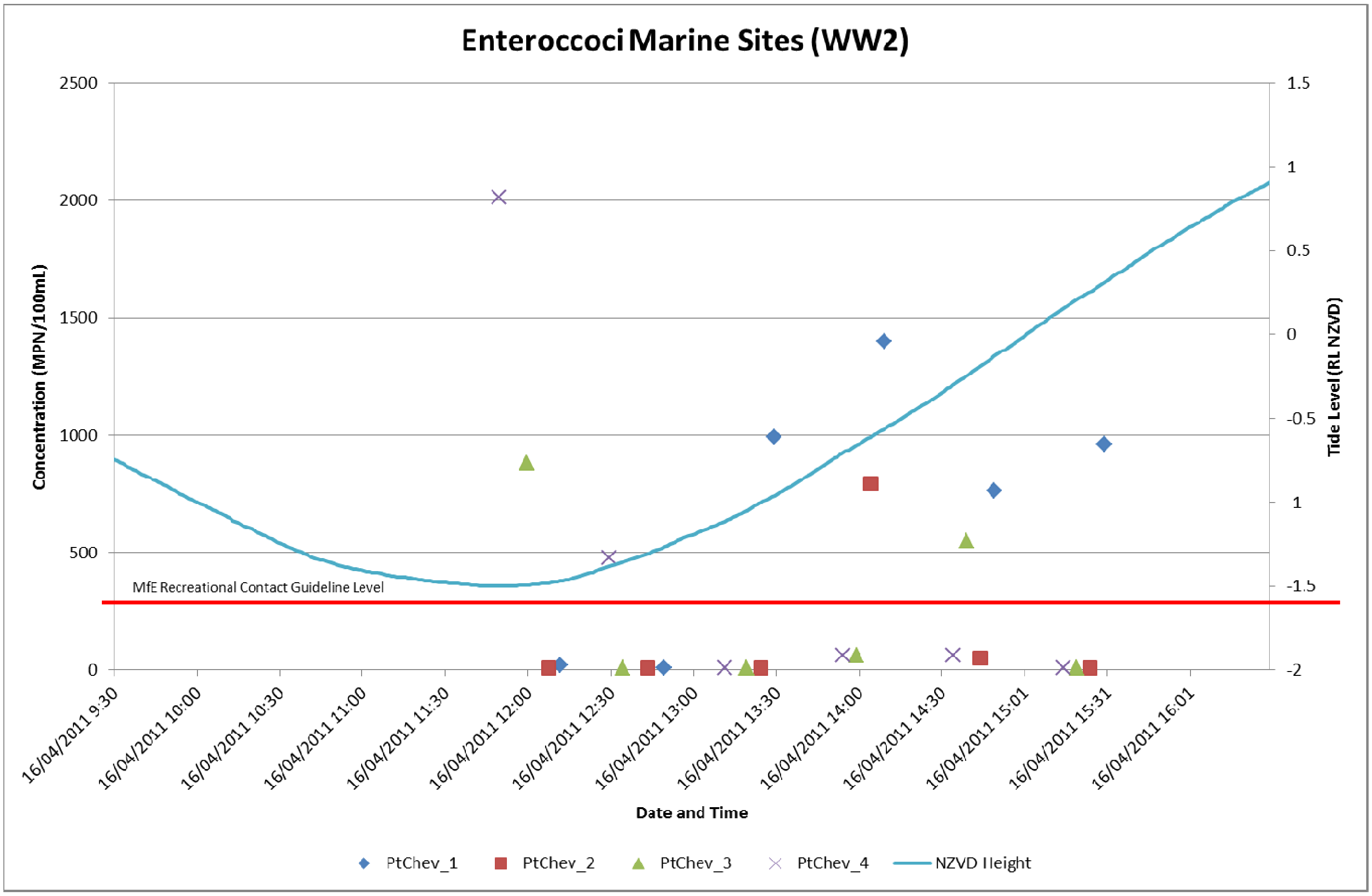


Figure 24: Enterococci concentrations across four marine sites during WW2 in relation to tide and MfE recommended recreational contact level (280 MPN/100mL). Note: Sites PtChev 3 and 4 were impacted by heavy wave action and low tide level which caused stirring of sediments and therefore may have impacted Enterococci concentrations for the first sample for PtChev3 and for the first two samples for PtChev 4 during low tide.

Table 16: Public health indicators at catchment discharge and freshwater sites for Wet Weather Event 2.

Site Name	Time after CSO Minutes	*E. coli* (cfu/100mL)	Enterococci (MPN/100mL)	Campylobacter (MPN/L)	Noroviruses by PCR			
					NoV GI		NoV GII	
	0	2270000	365400	<1	Neg		Pos	
	10	1780000	325500	<1	Neg		Neg	
	20	1350000	579400					
	30	1130000	325500					
Meo_CSO	60	960000	190400					
	0	960	420					
	30	6000	987	3	Pos		Neg	
	60	8300	2224	<1	Pos		Neg	
	120	179000	66300					
	180	271000	71700					
Meo_DS	240	440000	86700					
	0	7700	4106					
	30	25000	19863					
	60	49000	24196					
	120	7500	6488					
	180	63000	23100					
Meo_HB	240	680000	125900					
	0	7000	3255	<1	Neg		Neg	
	10	4400	3255	<1	Neg		Neg	
	20	5600	2909					
	30	4000	2098					
	60	4800	3255					
Meo_SW	120	2300	3873					
	0	12200	7701					
	30	7200	2755					
	60	54000	5794					
	120	6700	2359					
	180	9700	11199					
Meo_US	240	4200	5475					

7.3.2 Contaminant Loads

The following section indicates contaminant load patterns of Wet Weather Event 2 as indicated by TSS and zinc concentrations. Typical wastewater and stormwater contaminants are included in Table 17.

The following graphs show the TSS concentration of Wet Weather Event 2 for both the catchment discharges (Figure 25) and stream receiving environment sites (Figure 26). Zinc concentrations for Wet Weather Event 2 are also included for both the catchment discharges (Figure 27) and stream receiving environment sites (Figure 28)

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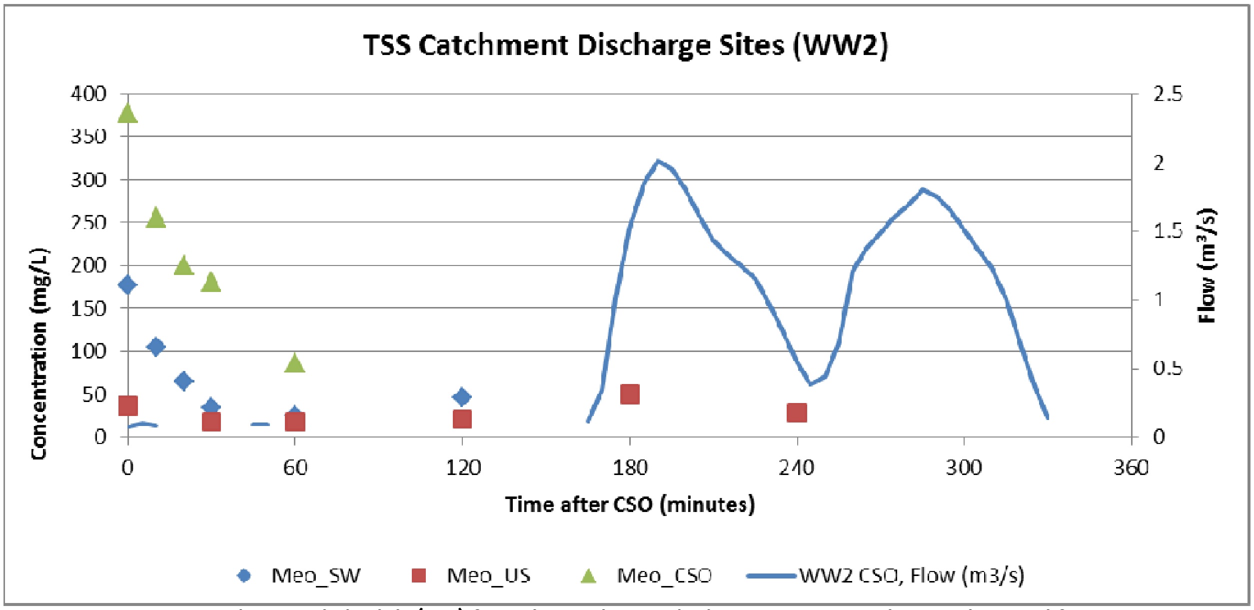

Figure 25: Total suspended solids (TSS) from the catchment discharge sites across the sample period for WW2.

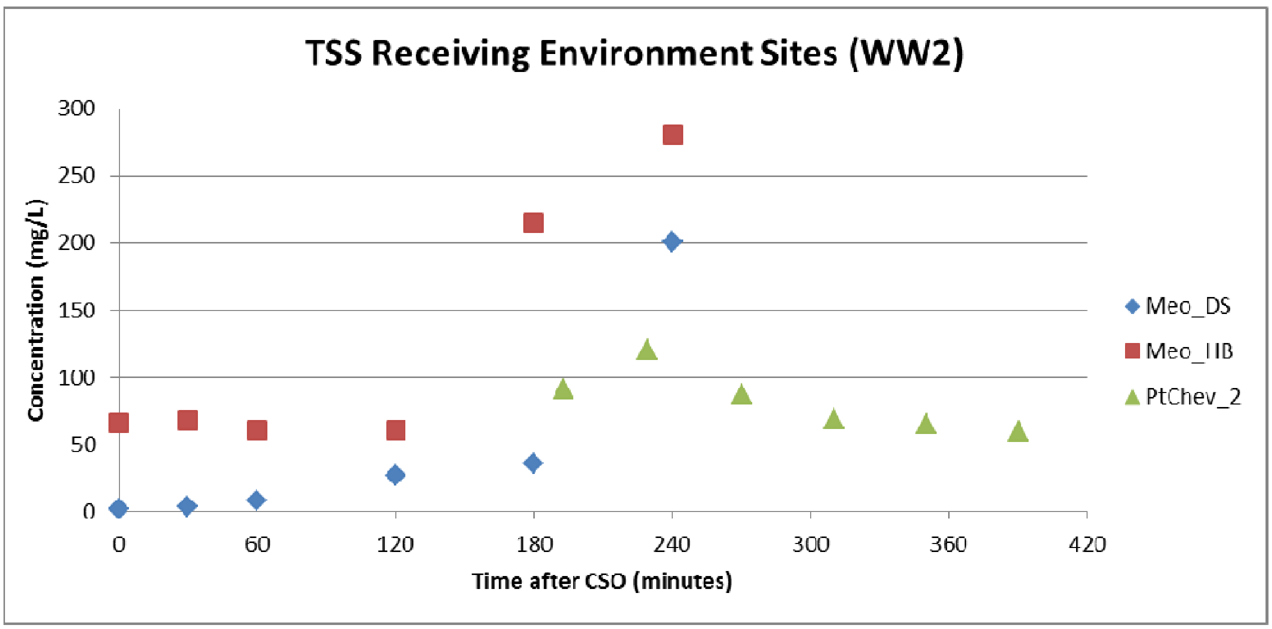

Figure 26: Total suspended solids (TSS) from the receiving environment sites across the sample period for WW2 (nb: PtChev2 has been chosen to represent the marine sites).

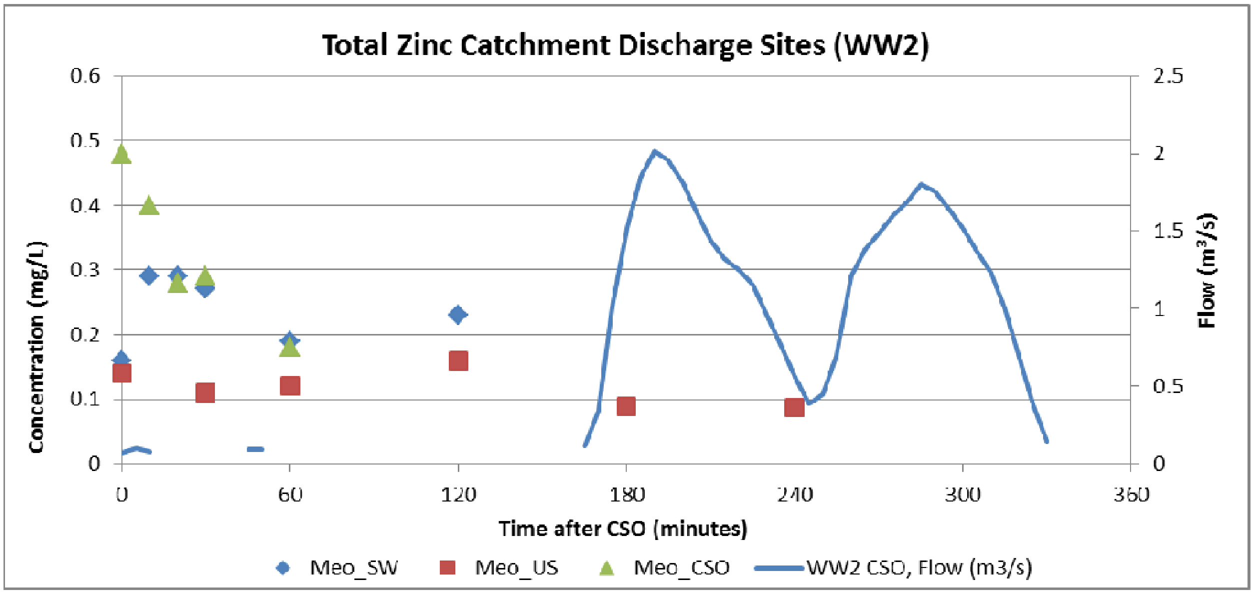

Figure 27: Total zinc concentration from the catchment discharge sites across the sample period for WW2.

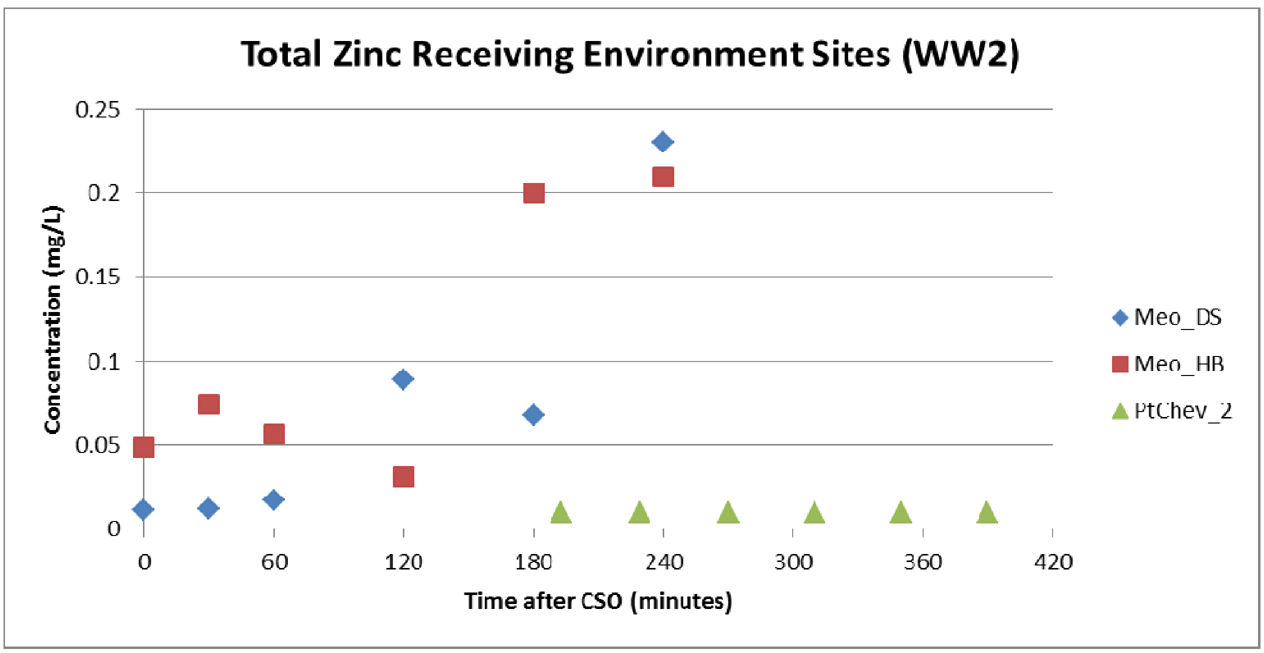

Figure 28: Total zinc concentration from the receiving environment sites across the sample period for WW2 (n.b.: PtChev2 has been chosen to represent the marine sites).

Table 17: Water quality parameters at all sites during Wet Weather Event 1. Note: Peak values are highlighted in blue. PtChev2 has been chosen to represent marine sites.

Site Name	Time after CSO	TSS	VSS	TPH	Soluble Copper	Total Copper	Soluble Lead	Total Lead	Soluble Zinc	Total Zinc	BOD	Ammonia Nitrogen	Soluble Reactive Phosphorous	TKN
	Minutes	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L O	mg/L N	mg/L P	mg/L N
Meo_CSO	0	**377**	**225**	1.2	**0.0058**	**0.061**	0.00083	**0.036**	0.035	**0.48**	**170**	**9.9**	1.706	**24.99**
	10	255.5	179	0.56	0.0046	0.058	0.0011	0.025	0.026	0.4	150	9.7	1.737	23.81
	20	199.5	142	**1.96**	0.0029	0.042	0.0006	0.02	0.017	0.28	100	7.3	1.238	16.74
	30	181	132	0.57	0.0035	0.039	0.00083	0.017	0.023	0.29	100	7.5	**1.426**	18.27
	60	85. 7	73	1.18	0.0049	0.022	**0.0012**	0.0073	**0.044**	0.18	62	5.5	1.017	12.11
Meo_SW	0	**177.5**	**81.5**	<0.3	**0.016**	0.026	0.00026	0.0051	0.092	0.16	25	0.331	0.085	2.34
	10	104.5	49	<0.3	0.015	0.041	0.00027	**0.019**	0.086	**0.29**	**14**	**0.271**	**0.077**	**1.67**
	20	64. 7	36	<0.3	0.015	0.04	0.00037	0.012	0.12	**0.29**	13	0.246	0.071	1.14
	30	33.8	19.2	<0.3	0.014	0.026	0.0003	0.0054	**0.16**	0.27	8.4	0.152	0.061	0.72
	60	24	12	<0.3	0.014	0.024	0.00037	0.0041	0.12	0.19	6.8	0.194	0.076	0.74
	120	45.8	23.2	<0.3	**0.016**	**0.045**	0.00035	0.015	0.097	0.23	5.6	0.117	0.046	0.74
Meo_US	0	36.2	25.6	**1.14**	0.0064	**0.015**	**0.00076**	0.0066	0.077	0.14	**34**	0.34	**0.079**	1.17
	30	17.8	12.8	<0.3	0.0055	0.011	0.00063	0.004	0.071	0.11	5.9	0.225	0.046	0.87
	60	18.4	12.8	<0.3	0.0051	0.0093	0.00062	0.0026	0.089	0.12	8.4	**0.537**	**0.078**	**1.71**
	120	20.6	12.6	<0.3	**0.0077**	0.014	0.00071	0.0043	**0.12**	**0.16**	6.8	0.23	0.048	0.49
	180	**50.4**	**27.4**	<0.3	0.0028	0.012	0.0003	**0.0083**	0.036	0.088	8	0.098	0.021	0.87
	240	28	14	<0.3	0.0025	0.0074	0.00019	0.0029	0.051	0.086	6.9	0.114	0.026	0.78
Meo_DS	0	2	2	<0.3	0.00086	0.0014	< 0.0001	0.00052	0.0077	0.011	2	0.03	0.06	0.1
	30	3. 7	2. 7	<0.3	0.0011	0.002	< 0.0001	0.0009	0.0078	0.012	2	0.042	0.064	0.14
	60	7.8	2.8	<0.3	0.0016	0.0028	< 0.0001	0.0016	0.011	0.017	2	0.097	0.073	0.37
	120	26.3	14	<0.3	**0.0048**	0.012	**0.0004**	0.0053	**0.048**	0.089	13	1.381	0.205	2.36
	180	35.3	13.3	<0.3	0.0038	0.011	0.00017	0.0065	0.026	0.068	14	**2.189**	**0.249**	3.51
	240	**200.5**	**71**	<0.6	0.0025	**0.033**	0.0003	**0.038**	0.022	**0.23**	**28**	1.112	0.182	**4.31**

Site Name	Time after CSO	TSS	VSS	TPH	Soluble Copper	Total Copper	Soluble Lead	Total Lead	Soluble Zinc	Total Zinc	BOD	Ammonia Nitrogen	Soluble Reactive Phosphorous	TKN
	Minutes	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L O	mg/L N	mg/L P	mg/L N
Meo_HB	0	65.8	15.6	< 0.30	< 0.002	0.0051	< 0.001	0.0064	0.026	0.049	2	0.211	0.043	0.27
	30	68	17.6	< 0.30	< 0.002	0.007	< 0.001	0.0078	0.04	0.074	2.6	0.274	0.047	0.44
	60	60.4	15.6	< 0.30	< 0.002	0.0056	< 0.001	0.0065	**0.031**	0.057	2.4	0.316	0.054	0.43
	120	60.8	15.4	< 0.30	< 0.002	0.0056	< 0.001	0.0078	0.014	0.031	2	0.168	0.046	1.14
	180	214.67	63.3	**< 1.50**	< 0.002	0.027	< 0.001	0.042	0.023	0.2	8.5	0.265	0.068	2.79
	240	**281**	**84.5**	< 0.60	**0.0032**	**0.04**	< 0.001	**0.063**	0.019	**0.21**	**28**	**2.09**	**0.327**	**6.038**
PtChev 2	A	90.6	12.6	< 0.30	< 0.002	0.0021	< 0.001	0.0016	< 0.01	< 0.0099		**0.019**	**0.02**	0.123
	B	**120.2**	**15.2**	< 0.30	< 0.002	< 0.002	< 0.001	< 0.00099	< 0.01	< 0.0099		0.009	0.018	**0.077**
	C	87	10.2	< 0.30	< 0.002	< 0.002	< 0.001	< 0.00099	< 0.01	< 0.0099		0.005	0.019	0.015
	D	68.8	11	< 0.30	< 0.002	< 0.002	< 0.001	< 0.00099	< 0.01	< 0.0099		0.012	0.018	0.07
	E	64.8	8.6	< 0.30	< 0.002	0.0022	< 0.001	< 0.00099	< 0.01	< 0.0099		0.005	0.018	0.022
	F	59.6	9.2	< 0.30	< 0.002	**0.0029**	< 0.001	**0.0021**	< 0.01	< 0.0099		0.005	0.018	0.018

7.3.3 Particle Size Distribution

The following section indicates the PSD of Wet Weather Event 2 as indicated by the Meo_CSO catchment discharge site (Figure 29) and an average for each site (Figure 30). The graphs below relate to percentage of TSS volume smaller than the given size.

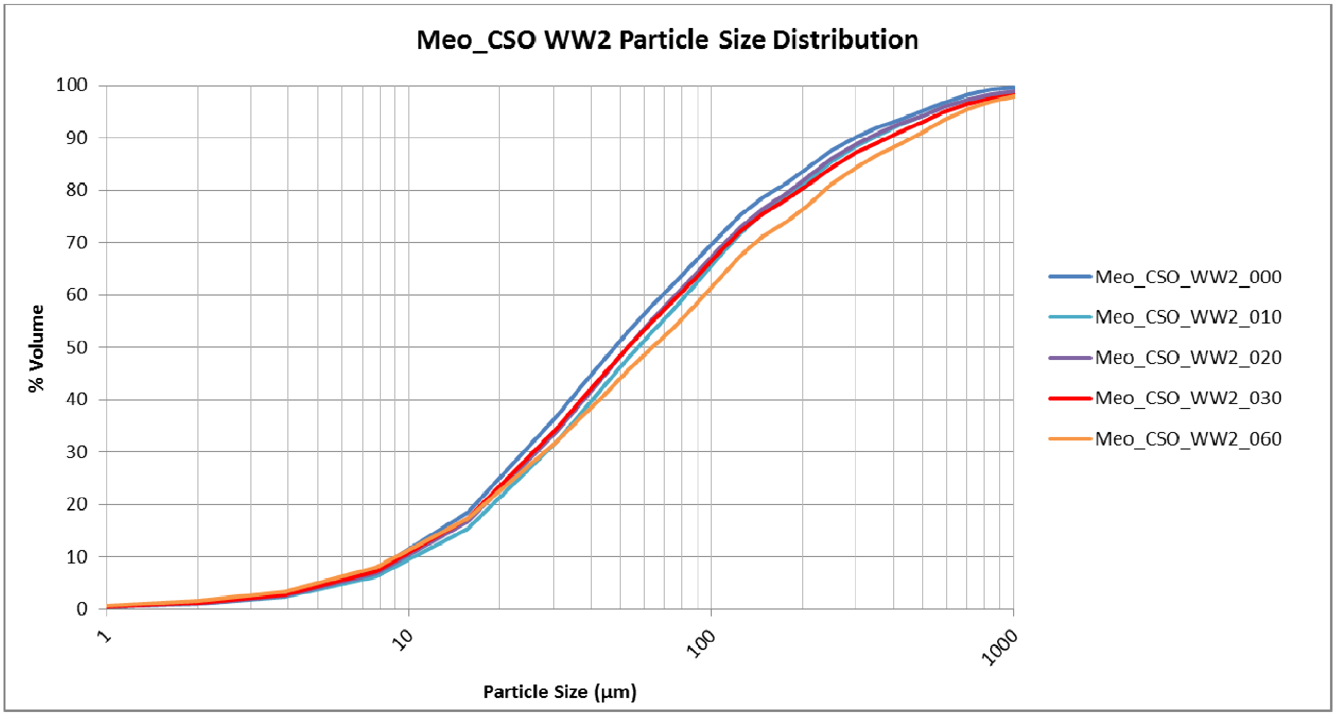

Figure 29: Particle size distribution for the Meo_CSO site over a 60 minute period during CSO overflow on 16-04-2011, where the 3-digit number at the end of the sample name indicates the time in minutes after overflow began.

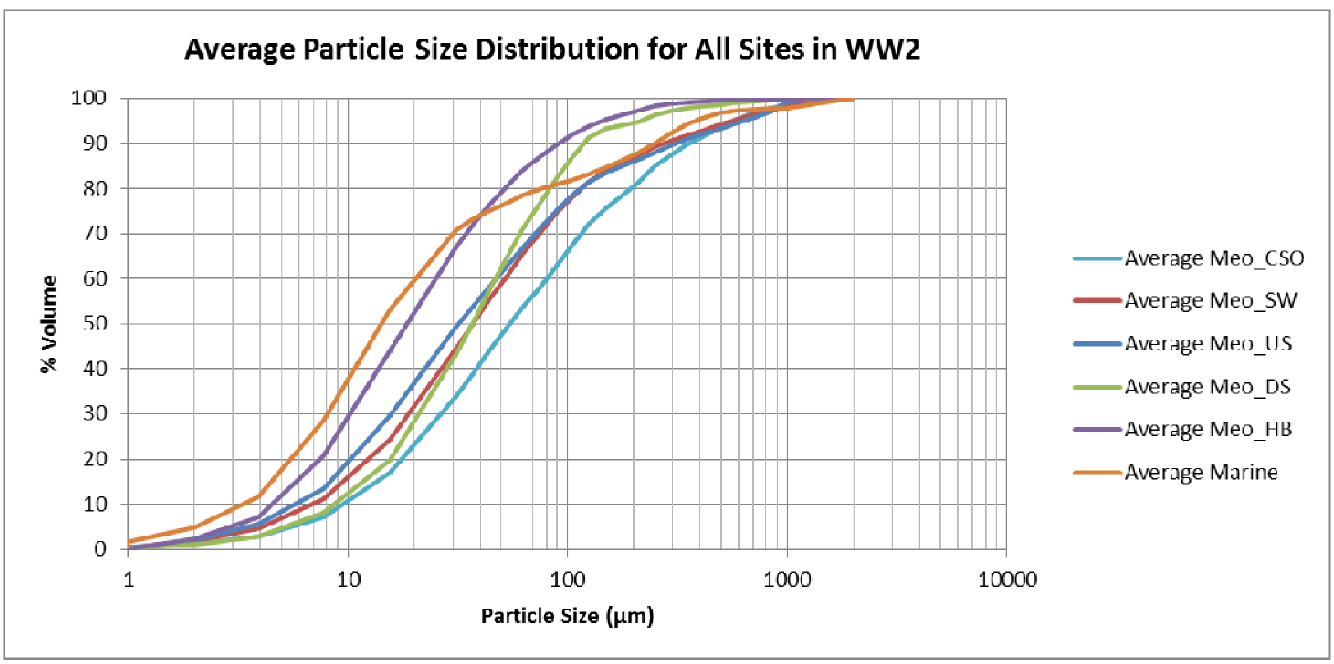

Figure 30: Average particle size distribution for each of the sites sampled for WW2(nb: PtChev1-4 have been averaged together to produce the Average Marine data).

7.4 Wet Weather Event Comparison

This section of the report compares key water quality parameters for the Meo_CSO and Meo_SW sites between the first and second wet weather event captured in January and April 2011. In addition, results from a one-off CSO sampling (at the Meo_CSO site) undertaken on the 27/04/2010 are included to compare between three wet weather events.

7.4.1 Meo_CSO Site

7.4.1.1 E.coli

Overall, the highest concentrations of disease-causing organisms were found during initial overflow periods, a process known as 'first flush effect'. However, *E. coli* concentrations were significantly lower in WW1 than in the WW2 and the April 2010 sampling event, with WW2 having a much more pronounced first flush effect than WW1 Table 18. The lower concentrations of *E. coli* during WW1 are potentially due to the extended period of rain prior to the overflow occurring. Approximately 7.5 mm of rain fell over 3 hours, 20 minutes prior to the WW1 overflow compared to 3.5 mm (over 1 hour, 20 minutes) for WW2. It is therefore likely that much of the accumulated sediments and contaminants within the combined network were washed through the trunk sewer during the slower rising arm of the WW1 event. This would have resulted in a less pronounced first flush pattern. Refer Table 18.

Table 18: *E. coli* (cfu/100mL) concentration comparison across three wet weather events.

Site Name	Time after CSO (Minutes)	Wet Weather Event 1 *E.coli* (cfu/100mL)	Wet Weather Event 2 *E.coli* (cfu/100mL)	Wet Weather Event 27/04/10 *E.coli* (cfu/100mL)
Meo_CSO	0	82000	2270000	2400000
	10	88000	1780000	1300000
	20	64000	1350000	520000
	30	50000	1130000	550000
	60	54000	960000	200000
	120	540000	Overflow Stopped	Not sampled

7.4.1.2 Total Suspended Solids (TSS)/Volatile Suspended Solids (VSS)

As for *E. coli*, the concentration of TSS in WW2 and the April 2010 event were higher than that of WW1, with a stronger first flush effect (Table 19). It is expected that this is again due to sufficient rainfall prior to overflow causing accumulated contaminants to be washed passed the overflow within the trunk sewer. The average percentage of TSS that was volatile or of an organic nature across all three sampled events was 75%, with a range between 60% - 87% VSS (Table 19).

Table 19: Comparison of total suspended solids and volatile matter concentration at Meo_CSO across three wet weather events.

Site Name	Time after CSO (Minutes)	Wet Weather Event 1		Wet Weather Event 2		Wet Weather Event 27/04/2010	
		TSS (mg/L)	VSS (mg/L)	TSS (mg/L)	VSS (mg/L)	TSS (mg/L)	VSS (mg/L)
Meo_CSO	0	121	98	377	225	405	296
	10	98	76	256	179	343	252
	20	84	67	200	142	229	154
	30	67	54	181	132	160	104
	60	57	49	86	73	64	45
	120	52	45				

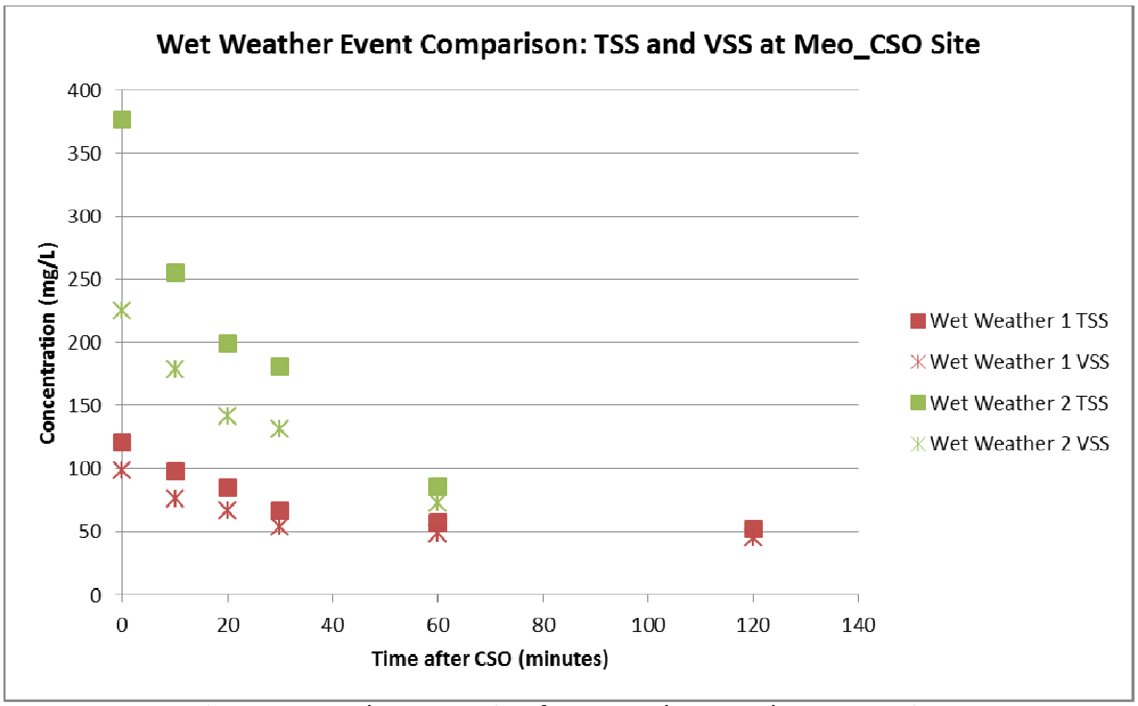

Figure 31: TSS and VSS comparison for WW1 and WW2 at the Meo_CSO site.

7.4.2 Meo_SW Site

TSS and VSS concentrations were lower at the Meo_SW site than at the Meo_CSO site. As an average of all samples, TSS at the Meo_SW site was one third of the Meo_CSO values (Table 20). Although lower, the pattern of TSS and VSS results indicates a similar first flush effect to that of the CSO. As the Meo_SW site is not connected to the CSO, the results obtained are likely to be indicative of the tail end of the contaminant concentrations from the first flush. That is, as time = 0 is triggered by the CSO overflowing, peak contaminants present on the land surface and in the stormwater pipe may have already been removed in the first stormwater flows, and are higher than the results indicate.

The average percentage of TSS that was volatile, or of an organic nature for the SW across both sampled events was 57%, with a range between 46% - 73% VSS. This is a lower proportion of VSS than the CSO.

Table 20: Total suspended solids and volatile matter concentration comparison between WW1 and WW2 at the Meo_SW site.

Site Name	Time after CSO Minutes	Wet Weather Event 1		Wet Weather Event 2	
		TSS (mg/L)	VSS (mg/L)	TSS (mg/L)	VSS (mg/L)
Meo_SW	0	36.8	16.8	177.5	81.5
	10	35.6	16.2	104.5	49
	20	26	12.4	64. 7	36
	30	26.2	12.4	33.8	19.2
	60	20.4	10	24	12
	120	12	7	45.8	23.2

8.0 Discussion

The following section includes discussion of the implications of the monitoring results regarding some key impacts on the Meola Creek, including:

- Oxygen Demand
- Public Health Risk
- Contaminant loads and “First Flush” patterns

8.1 Oxygen Demand

Prolonged low dissolved oxygen conditions can harm fish and aquatic organisms, and promote anaerobic bacteria that produce foul odours. It is noted that the interaction of oxygen demanding substances and the subsequent effects on dissolved oxygen within a waterway is complex. In general the approximate loading or oxygen demand could be from the following sources (FISRWG 1998):

- Organic materials that are able to be oxidised biochemically - measured as BOD:
    - **Oxidisable material + bacteria + nutrient + O_2 → CO_2 + H_2O + oxidised inorganics such as NO_3 or SO_4**
- Oxygen consumption by fully oxidising all organic compounds and chemicals such as sulphides and nitrites (included with the COD measure along with the organic material included in BOD), typically as follows:
    - **$S^2 + 2\,O_2 \rightarrow SO_4^{2-}$**
    - **$NO_2^- + ½\,O_2 \rightarrow NO_3^-$**

- Oxidation of Ammonia to Nitrate (not included in COD)
    - $NH_3 + 2O_2 \rightarrow NO_3^- + H_3O^+$
- Sediment oxygen demand; this is the oxygen demand of sediment organism respiration and the decomposition of organic material.
- Respiration of in stream algae and other plants during the night. This is accompanied by a corresponding input of oxygen during the day due to photosynthesis. Therefore this is likely to have an impact on oxygen demand. Excessive algae growth has been noted in the upper Meola Creek above the Alberton Ave Culvert. Plant growth is normally limited by light and the quantity of nutrients available. Therefore the high diurnal fluctuation in oxygen in the upper Meola Creek during the sample period is indicative of the organic loadings and high plant growth

As the residence times of the wet weather discharges are unlikely to be high enough for oxygenation of nitrites, sulphites and other chemical compounds, the key parameters for modelling of oxygen demand will be BOD and possibly ammonia. There will also be significant ongoing oxygen demand throughout dry weather periods as a result of accumulated organic sediments in the stream channel.

Water temperature within a stream is affected by temperature of upstream and influent water and processes within a stream reach including ambient temperature, shade and depth variation (FISRWG 1998). The temperature in the upper Meola Creek during the monitoring period was high as discussed in Section 4.2, while the temperature in the lower Meola Creek was lower, most likely due to the increased aquifer inputs between the two sites.

Temperature influences dissolved oxygen in two main ways. Higher temperatures limit the ability for oxygen to remain dissolved in water, with lower dissolved oxygen concentrations for a given saturation percentage. Also higher temperatures can promote increased biological activity that increases oxygen demand. An increase in temperature can increase metabolic and reproductive rates of microbes (FISRWG, 2008).

Rainfall and stormwater flows typically have high oxygenation. It is also observed that dissolved oxygen is sensitive to changes in base flow which can drive re-aeration by increasing diffusion of oxygen into the water from the atmosphere. In particular increased aquifer inputs lead to higher base flows in the lower Meola Creek, and intermittently in the upper Meola Creek. This has a corresponding increase in the dissolved oxygen readings. Therefore, assessment of the impacts on dissolved oxygen needs to consider the loading of oxygen demanding substances as indicated by BOD discharges in addition to the re-aeration processes within the waterway, normally governed by flow turbulence and temperature. In general key management items to address the oxygen demand and subsequent lowered dissolved oxygen and life supporting capacity in the stream include reduction of organic loadings, maintenance of baseflow for re-aeration and reduction of water temperatures through shading and reduced impervious surfaces.

8.2 Public Health Risk

Human contact with water-borne pathogens and possible consequences such as the entry to the bloodstream by these pathogens through abrasions or gastrointestinal tract by ingestion is very likely to result in illness. Of particular importance in this risk equation is the concentration of pathogens within the water body.

During dry weather sampling, levels of indicator bacteria within the freshwater environment were up to 5-10 times above recreational contact guidelines on several occasions. Elevated levels of bacteria, above guidelines, were not observed in the marine environment at any of the Point Chevalier Beach sites. However, despite there being no indicator bacteria of concern, norovirus was present at one of the beach sites during baseline sampling. The norovirus detected at potentially infectious levels (Refer Section 5.7) was a likely result of a dry weather overflow in the catchment, however there was no reason to suspect any risk to public health based on the indicator bacteria results. This tends to suggest that if dry weather overflows occur without immediate reporting and maintenance action resulting, there is a potential risk to public health, even if levels of indicator bacteria are acceptable.

During wet weather events the volume of untreated wastewater entering the receiving environment is of concern with concentrations of >2 million *E. coli* released in the first flush of the WW2 CSO overflow at the Meo_CSO site alone. As there are multiple overflows within the catchment, it is likely that the numbers of bacteria entering the receiving environment is higher than recorded. While no investigation has been undertaken of the recreational use of the stream and estuary environments, there were several contact recreational users of Point Chevalier beach during and immediately following the WW2 event.

The time taken for the receiving environment to assimilate the microbiological and other contaminants will increase the chance of recreational contact. This study did not include regular monitoring post-overflow to determine the 'recovery time' of the stream, however some results were obtained in the April 2010 sampling effort. For this earlier wet weather event, two stream receiving environment sites were assessed. At the site upstream of the Alberton Ave culvert (USAAG), *E. coli* levels were high prior to the overflow, but had not dropped back to the pre – event 'baseline' level after 72 hours. At the site downstream of the culvert (DSAAG), *E. coli* levels had decreased to just under the recreational contact level guidelines of 550cfu/100mL after 72 hours, indicating a relatively slow recovery to safe water quality levels after an overflow.

The Auckland Council Safe Swim programme identifies wastewater and stormwater as contaminants and recommends that swimming should be avoided for 48 hours after heavy rain (Auckland Council Website, Safe Swim, Accessed 13/05/2011). To determine whether this timeframe of 48 hours is sufficient for the bacteria to reach acceptable levels after overflow events requires further research and/or modelling. Inputs from the freshwater to marine receiving environment may influence the risk to the public, particularly those who use the stream mouth for fishing and boating.

8.3 Contaminant Loads and First Flush

Sediment and its transport occur naturally in a stream, however changes in sediment load and particle size can cause negative impacts by altering aquatic communities, carrying pollutants and reducing amenity of the waterway (FISRWG 1998).

8.3.1 First Flush

The concept of 'first flush' has faced scepticism due to the variable nature in which different parameters react during different storm events and catchment dynamics. First flush refers to the initial volume or concentration of contaminants that are transported during the early stages of a storm event. In this project, the reference to first flush relates directly to the initial volumes of water entering the receiving environment from a discharge point (stormwater pipe or combined sewer overflow)

This report showed that there was an increased concentration of contaminants in the first flush from discharge points (Meo_CSO, Meo_SW and Meo_US). The contaminants that exhibited the most dramatic concentrations were those that are washed off the road or come from settled wastewater sludge in the sewage network. These contaminant concentrations exhibited a strong first flush pattern in the network discharge sites, while the lower catchment stream sites appeared to follow more of a dilution or slow accumulation pattern in the receiving environments.

No event results assessment has been conducted on contaminant loadings at the individual discharge sites. However, further study to correlate catchment area and storm intensity with particle size and contaminant load would be useful and may be able to be progressed as part of initial water quality modelling currently underway.

This first flush information is potentially important to the way in which stormwater and wastewater discharge management is carried out. It can be assumed, based on the contaminant loadings seen from the initial modelling study, that efficiency could be gained from treating the initial volumes of water discharging into the receiving environment as a priority as these are the 'dirtiest'.

8.3.2 Particle Size Distribution

Particle size distribution was analysed as a means of identifying the relative amount of particles by particle size. Particle size can be used in conjunction with TSS to determine the total load of sediment of a particular size through the system.

Many contaminants bind to sediment particles which can be assessed as both a function of TSS and particle size. In general, smaller size fractions have a greater influence on water quality by providing more particles for contaminants to bind to.

The varying energy throughout a stream system under changing hydrological situations provides for transport of sediment (FISRWG, 1998). This will affect the transport of contaminants through the stream system including the ability for larger particles to settle out over the course of an event. The general pattern from sampling was for discharge sources to contain a mix of particle sizes including larger particles, with receiving environment sites containing finer particles.

This is potentially due to a proportion of the coarser sediments settling out and becoming bed load. This pattern was not seen in the Meo_CSO results for WW1 which had predominantly fine particles. This may be due to the influence of hydraulic structures of the weir, and the slower rising arm of the associated hydrograph for this event, leading to a subset of finer particles being discharged from the network.

9.0 Summary

The Meola Catchment 2011 Monitoring has been completed as scoped, including additional flow and rainfall sites and extended duration of continuous monitoring. This has provided a valuable body of knowledge relating to water quality conditions and response to wet weather discharges. This study has also been valuable in identifying patterns and trends throughout the catchment receiving environments, for both wet and dry weather conditions.
Of particular note are the following:

- The continuous monitors have identified the variation throughout the catchment due to aquifer inputs. When there are higher groundwater levels, there is higher baseflow in the streams, and in particular the upstream portion exhibits greater variability. The upper Meola Creek as indicated by the Meo_MID_AAG site experiences daily troughs in dissolved oxygen to below life-supporting capacity in some conditions. In general, key management items to address the oxygen demand and subsequent lowered dissolved oxygen and life supporting capacity in the stream include reduction of organic loadings, increased baseflow to enhance re-aeration and reduction of water temperatures through shading and reduced impervious surfaces.

- Baseline monitoring has identified DWO's and subsequently norovirus in the downstream and marine receiving environment. In addition, *E. coli* levels were measured above recreational contact guidelines at most stream sites, on the majority of occasions throughout the sampling period. Norovirus was present at potentially infectious concentrations and small quantities of campylobacter were also found in the receiving environment during some baseline conditions. COD throughout the sites was present at elevated levels, although BOD was not. Metals, primarily zinc, were elevated above trigger values in the baseline sampling in addition to being present in biofilms above sediment trigger values. Water quality was generally worst at the upper sites within the catchment. Biofilm results also revealed this pattern of more impacted stream health in the upper catchment than in the lower creek.

- Wet weather monitoring was carried out during two types of event:
    - A slowing rising event, the results obtained indicate first flush effects are still evident and entering the stream from both CSO and stormwater sources.
    - A faster rising event, similar to the April 27th, 2010 event. The results strongly indicate a first flush effect for most contaminants from both the CSO and stormwater sources.
    - Stormwater and wastewater discharge management should consider potential efficiency from treating the initial volumes of water discharging into the receiving environment as a priority as these are the 'dirtiest'.
    - Potential further study could be undertaken to correlate catchment area and storm intensity with particle size and contaminant load. This may be able to be progressed as part of initial water quality modelling currently underway.

10.0 References

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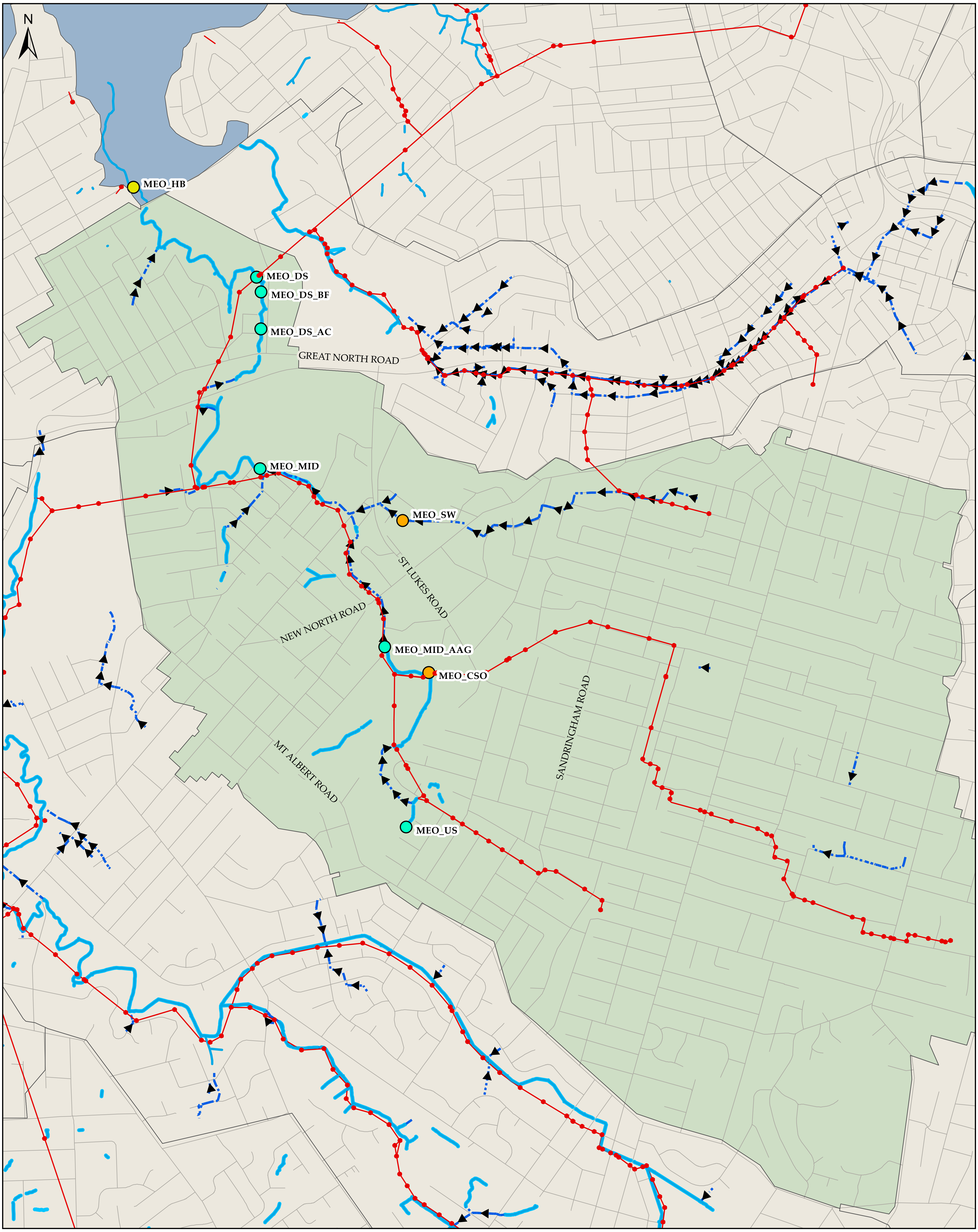
Appendix A: Site Location Map

Meola Catchment Pilot Environmental Monitoring Study



Sample Sites
- Catchment Discharge Site
- Estuarine Site
- Freshwater Site
- Marine Site

- Watercourse
- Watercare Trunk Sewer
- Stormwater Pipes (>750mm)
- Waste Water Manhole

- Other Catchments
- Meola Catchment

Auckland Council

MORPHUM ENVIRONMENTAL LTD

Project: Meola Catchment Pilot Environmental Monitoring Study	
Project No : ACC080	
Client : Auckland Council	
Scale : 1 to 15,000 @A3	
Sheet 1 of 1	Version : 2
Date: 04/08/2011	Drawn by : AP
Map Number: 1	Approved by : CC

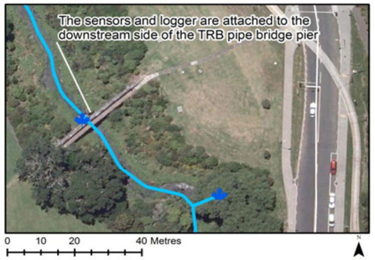
Appendix B: Monitoring Device Quality Records

Site name:	MEO_DS
Site location:	Pasadena Intermediate footbridge
National site number:	n/a
Easting/northing	1,753,168.602; 5,918,810.761
Installed date:	Friday, 19 November 2010
Stream channel/pipe/culvert:	Stream
Flow control:	Nil - natural channel

Instrument specifications

	Manufacturer	Model	Serial No.	Resolution	Accuracy	Range	Method	Output	Logging interval	Max Current draw(mA)
Logger:	iQuest (NZ) Ltd	iRIS 350	AG4-0682							3
Sensors:										
Temperature	Zebra-Tech Ltd	D-Opto	2588	0.01°C	+/- 0.1°C	0-50°C	SS probe	SDI-12	5 min	10
Dissolved Oxygen	Zebra-Tech Ltd	D-Opto	2588	0.01%,0.001ppm	> of 1% or 0.02ppm	0-25ppm	Optical	SDI-12	5 min	
Turbidity	Global Water	WQ730	1.045E+09	16 bit	+/- 10.0 NTU	0-1000 NTU	90° Nephelometer	4-20mA	5 min	50
Water level	Instrumentation Northwest Inc	AquiStar		16 bit (0.001m)	+/- 0.1% FSO	0-3m	Silicon strain gauge	SDI-12	5 min	3 Avg / 10 Peak
pH	Global Water	WQ201	1.045E+09	16 bit	+/- 2% of full scale	0-14 pH	Chemical electrical cell	4-20mA	5 min	25
Time stamp setting	GMT +13 (NZDST)									
Sensor locations	On pipe bridge abutment									
Logging interval	All 5min instantaneous									
Telemetry	All sensors									

Site Sketch



Downstream photo

Upstream photo

Sensor location Photo

Site name:	MEO_MID_AGG
Site location:	Alberton Ave Grill
National site number:	Inlet Asset ID NS3374; DM_ID 192671
Easting; Northing	1753865.043; 5916794.776
Installed date:	Wednesday, 17 November 2010
Stream channel/pipe/culvert:	Stream and culvert
Flow control:	WQ and level =150mm 120° v-notch weir, flow = downstream culvert bend

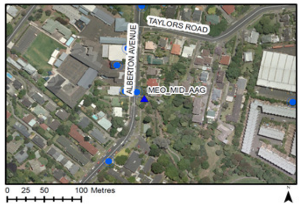
Instrument specifications

	Manufacturer	Model	Serial No.	Resolution	Accuracy	Range	Method	Output	Logging interval	Max Current draw(mA)
Logger:	iQuest (NZ) Ltd	iRIS 350	AG4-0683							3
Sensors:										
Temperature	Zebra-Tech Ltd	D-Opto	2589	0.01°C	+/- 0.1°C	0-50°C	SS probe	SDI-12	5 min Period Av	10
Dissolved Oxygen	Zebra-Tech Ltd	D-Opto	2589	0.01%,0.001ppm	> of 1% or 0.02ppm	0-25ppm	Optical	SDI-12	5 min Period Av	
Turbidity	Global Water	WQ730	1045106654	16 bit	+/- 10.0 NTU	0-1000 NTU	90° Nephelometer	4-20mA	5 min Period Av	50
Water level	Instrumentation Northwest Inc	AquiStar		16 bit (0.001 m)	+/- 0.1% FSO	0-3m	Silicon strain gauge	SDI-12	5 min Instantaneous	3 Avg / 10 Peak
pH	Global Water	WQ201	1045106657	16 bit	+/- 2% of full scale	0-14 pH	Chemical electrical cell	4-20mA	5 min Period Av	25
Time stamp setting	GMT +13 (NZDST)									
Sensor locations	1.5m u/s of inlet									
Logging interval	All 5min									
Telemetry	Yes									
Data capture	All sensors									

Flow Sensor

	Manufacturer	Model	Serial No.	Resolution	Accuracy	Range	Method	Output	Logging interval	Max Current draw(mA)
Flow sensor	Sontec	Argonaut SW	T1844	0.1cm/s	+/-1% velocity, 0.1% level	+/- 5m/s velocity, 5m level	Doppler	Self logging	5 minute average	500-700mW nominal
Installed date	Wednesday, 22 December 2010									
Sensor locations	Flow 3m d/s of inlet									
Logging interval	5 minute average									
Telemetry	No									
Data capture	Manual download									

Site Sketch



Downstream photo

Upstream photo

Sensor location Photo

Culvert x-section for Agonaut

Height Area

CAD Area Plot

Site name: MEO_SW
Site location: Manhole on Malvern Road
Down manhole Asset name NO8725; DM_ID
National site number: 229149
Easting; northing 1,753,967.065; 5,917,482.744
Installed date: Thursday, 23 December 2010
Stream channel/pipe/culvert: SW pipe: Asset ID NI3581; DM_ID315022
Accessed by: SW manhole: Asset ID NO8725; DM_ID 229149
Flow control: No specific, in pipe of 918 mm diameter

Instrument specifications

	Manufacturer	Model	Serial No.	Resolution	Accuracy	Range	Method	Output	Logging interval	Max Current draw(mA)
Logger:	Sontec Inbuilt									3
Sensors:										
Flow	Sontec	Argonaut SW	T1848	0.1cm/s	+/-1% velocity, 0.1% level	+/- 5m/s velocity, 5m level	Doppler	Self logging	5 minute average	500-700mW nominal

Time stamp setting GMT +13 (NZDST)
Sensor locations 2 metres up pipeline NI3581
Logging interval 5min
Telemetry No
Data capture Manual download from internal memory

Upstream photo

Site Sketch

Site name:	MEO_US
Site location:	ESR Tributary Asset name NY7847; DM_ID
National site number:	262587
Easting; northing	1,753,983.608; 5,915,807.624
Installed date:	Tuesday, 11 January 2011
Stream channel/pipe/culvert:	Chamber
Flow control:	90° v-notch weir

Instrument specifications

	Manufacturer	Model	Serial No.	Resolution	Accuracy	Range	Method	Output	Logging interval	Max Current draw(mA)
Logger:	iQuest (NZ) Ltd	DS4483								3
Sensors:										
Water level	Instrumentation Northwest Inc	AquiStar		16 bit (0.001m)	+/- 0.1% FSO	?	Silicon Strain Gauge	SDI-12	5 min	3 Avg / 10 Peak
Time stamp setting	GMT+12 (NZST)									
Sensor locations	Within NY7847 chamber									
Logging interval	5min instantaneous									
Telemetry	No									
Data capture	Manual download									

Site Sketch

Downstream photo

Upstream photo

Sensor location Photo

Field Note Record Sheet

Project: **ACC080 Meola WQ Pilot Study** **Site:** **MEO_DS**

Initials	Date	Time (NZDST)	Battery voltage (V)		Water level (m)		DO (ppm)			Turb (NTU)			**Comment** (cleaned sensor, changed battery etc)
			Current	Batt in	Instream	Difference	Instream/before	HH ref/after	Difference	Instream before	Instream after	Difference	
KH	18/11/2010	10am		12.82									Install logger DO and WL
Graham	20/11/2010												Installed pH and Turb
KH	03/12/2010	2:31:00 p.m.	12.16	12.68			8.92	8.96	0.04	-5	-5	0	Cleaned all sensors; Change Battery.
KH	15/12/2010	3:48:00 p.m.	12.15	12.92						0	-4		Cleaned all sensors; Change Battery.
KH	10/01/2011	1:55:00 p.m.	12.05	12.96						52	40	12	Cleaned all sensors; Change Battery.
KH	14/01/2011	11:30:00 a.m.								40	35	15	Cleaned all sensors; Cut back submerged plants
KH	18/02/2011	11:55:00 a.m.					5.16	4.45	0.72				DO comparison to YSI 556 n=8
KH	21/01/2011	3:10:00 p.m.	12.13	12.91									Change Battery
KH	28/01/2011	9:58:00 a.m.	-	-			8	7.35	0.65				Cont monitor to ProODO HH
KH	03/02/2011	3:30:00 p.m.					/9.22	/9.13	0.09	106	98	8	Clean sensors
KH	07/02/2011	3:09:00 p.m.	12.05	12.98									Battery Change
KH	24/02/2011	2:05pm	12.06	12.96						161	116		Battery Change; Clean Sensors
KH	07/03/2011	11:51am			-11.9								Error from WL 04/02/2011, check sensor, cable, breather tube No change. Power down for few min, power up, NO change. Refer to Envco.
Envco	07/03/2011	3:48pm			-11.9								Envco on-site check SDI12 setup and logger. Outcome the transducer or diaphragm have lost function.
KH + Envco	08/03/2011	11:20am			0.223					154	61	93	Envco switch WL sensor for spare, Clean turbidity while out of creek.
KH + CH	11/03/2011	9:51am	12.15	12.9									Check site and change batteries

Field Note Record Sheet

Project: ACC080 Meola WQ Pilot Study **Site:** **MEO_MID_AAG**

Initials	Date	Time DST	Battery voltage		Water level (m)			DO (ppm)			Temp (°C)			pH			Turb (NTU)			**Comment** (cleaned sensor, changed battery etc)
			Current	Batt in	Instream	After Clean	Difference	Instream	After Clean/HH	Difference	Instream	HH ref	Difference	Instream	HH ref	Difference	Instream	After Clean	Difference/Final	
KH	17/11/2010	3:00pm	12.8																	Install Data logger, DO and WL
Graham	20/11/2010																			Install pH and turb sensors
KH	24/11/2010	11:12am																		Clean Sensors, Check pH connections
KH	24/11/2010	4:35pm																		Meet Envco regards pH outputs
KH	29/11/2010	1:57pm						2.8	3.1	-0.349	24.2	24.5	-0.346	7.16	7.08	0.082				Conduct HH to in-situ (n=5); clean sensors
KH	03/12/2010	1:48pm	12.15	12.68																Change batt; clean sensors
KH	08/12/2010	2:07pm																		Clean Sensors
KH	15/12/2010	2:43pm	12.17	12.95	0.091	0.089	0.002													Conduct physical calibration of water level (n=11); Change batt; clean sensors
KH	21/12/2010	2:45pm																		Clean Sensors
KH	22/12/2010	AM																		Installed Argonaut
KH	24/12/2010	10:40am	12.53	12.95																Change batt
KH	10/01/2011	12:48pm		13.22																Clean Sensors, Change Argo Batt
KH	10/01/2011	4:49pm	12.16	13.1																Change Battery
KH	17/01/2011	11:08am	12.75																	Check Argo batt
KH	18/01/2011	11:00am	12.46					-0.06	1.36	-1.43										Conduct HH to in-situ (n=8); check argo batt
KH	20/01/2011	12:18pm	12.39																	Download Argonaut data Data
KH	21/01/2011	2:31pm		12.95																Download Argonaut data Data; Create power bridge change both batteries; re-deploy argonaut settings as no-data since yesterday.
KH	27/01/2011	3:25pm									22.12	21.68	0.44	6.42	6.63	-0.2				Conduct HH Hach Sension to in-situ (n=7)
KH	29/01/2011	3:00pm						6.06	6.66	0.60	22.22	22.11	0.11							Conduct calibration with HH YSI Pro O DO (n=9)
KH	02/02/2011	12:15pm	12.39																	Clear debris off argonaut; clean sensors; download data.
KH	15/02/2011	3:15pm	12.12	12.87													375			Clean Sensors; download data
KH	23/02/2011	1:35pm						3.5	4.1	0.6							134	8	-126	Clean Sensors
KH	25/02/2011	9.15 am																		Remove debris from v-notch
KH + CM	09/03/2011	8:56 a.m.			0.197	0.147	-0.05													Remove debris from v-notch
KH + CM	09/03/2011	11:04 a.m.						3.9	5.4	1.5							400	9	-391	Clean Sensors; Moved argonaut up channel
KH + CH	11/03/2011	10:20 a.m.																	0	Upload argonaut channel profile and deployed argonaut at new location

Field Note Record Sheet

Project: **ACC080 Meola WQ Pilot Study** **Site:** **MEO_SW**

Initials	Date	Time	Battery voltage (V)		Water level (m)			Comment (cleaned sensor, changed battery etc)
			Current	Batt in	Instream	HH ref	Difference	
KH, CM, GA	23/12/2010	11am						Installed the sensor
MH SJ	24/12/2010	11am		13.14 & 13.66				Change Batteries
KH + MH	12/01/2011	12:00pm	12.65					Download data; Set deployment
KH + MH	20/01/2011		12.52	12.98				Change Batts; Download data; Set deployment
DW + KR	28/01/2011		12.73					Rain event manual lid to water level measure
KH + ST	03/02/2011		12.61					Download data; Set deployment
KH + SC	15/02/2011		12.43	12.93				Change Batts; Download data; Set deployment
KH + MH	21/03/2011	11:22 p.m.	12.34					Download data; Set deployment
KH + CL	15/04/2011	1:40 p.m.	11.94	12.84				Download data; change batteries; Set deployment
KH + SC	19/05/2011	10.15am	12.22	12.77				Download data; change batteries; Set deployment

Field Note Record Sheet

Project: ACC080 Meola WQ Pilot Study **Site: MEO_US**

Initials	Date	Time	Battery voltage		Water level (m)			**Comment** (cleaned sensor, changed battery etc)
			Current	Batt in	Insitu	ref	Difference	
KH	11/01/2011	All day						Installed weir and water level sensor
KH	13/01/2011	8:10am	12.9					Check batt; asbuilt measure
KH	17/01/2011	1:05pm	12.75					Check batt; dwnld data
KH	20/01/2011	11:25am	12.67					Check batt; dwnld data
KH	24/01/2011	2:40pm	12.53					Check batt; dwnld data
KH	07/02/2011	3:39pm	12.04	12.95				Change batt; dwnld data
KH + CC	01/02/2011	10:20am			0.049	0.06	0.011	Conduct timed flow x 3; physical measure of head
KH	11/03/2011	1:22pm	11.86	12.95				Change batt; dwnld data
KH + CL	15/04/2011	11:45 p.m.	11.65	12.86				Change batt; dwnld data failed due to computer battery
KH	15/04/2011	3:20 p.m.	11.65	12.86				Dwnload data sucessful.
KH + CL	11/05/2011	11.09 a.m.	11.84	12.58				Dwnload data sucessful.
KH + CH	07/07/2011	10.50 am	11.55	12.73				Dwnload data sucessful.

Appendix C: Results Database

Watercare Batch Number	Sample Name	Date and Time	Location	Sample Regime	Sample Type	Test Result E.coli by m-TEC cfu/100mL	Decimal Result * refer note E.coli by m-TEC cfu/100mL	Test Result Enterococci by Enterolert 96	Decimal Result * refer note Enterococci by Enterolert 96 MPN/100mL	Test Result Enterococci	Decimal Result * refer note Enterococci cfu/100mL	Test Result MPN Campylobacter	Decimal Result * refer note MPN Campylobacter MPN/L	Virus preparation on water samples	Noroviruses by PCR	Test Result Alkalinity total by Autotitrator	Decimal Result * refer note Alkalinity total by Autotitrator mg/L CaCO3
10/35950	MEO_DS_Base_20101129	29/11/2010 10:00	Meo_DS	Baseline	FW	470 cfu/100mL	470			220 cfu/100ml	220					51 mg/L CaCO	51.09
10/35950	MEO_HB_Base_20101129	29/11/2010 10:00	Meo_HB	Baseline	FW/MARINE	1400 cfu/100mL	1400			480 cfu/100ml	480						
10/35950	MEO_MID_Base_20101129	29/11/2010 10:00	Meo_MID	Baseline	FW	9100 cfu/100mL	9100			920 cfu/100ml	920					76 mg/L CaCO	76.2
10/35950	MEO_US_Base_20101129	29/11/2010 10:00	Meo_US	Baseline	FW	2300 cfu/100mL	2300			510 cfu/100ml	510					53 mg/L CaCO	52.85
10/35950	PtChev_1_Base_20101129	29/11/2010 10:00	PtChev_1	Baseline	MARINE	< 10 cfu/100mL	10			18 cfu/100mL	18						
10/35950	PtChev_2_Base_20101129	29/11/2010 10:00	PtChev_2	Baseline	MARINE	< 10 cfu/100mL	10			< 10 cfu/100ml	10				Negative		
10/35950	PtChev_3_Base_20101129	29/11/2010 10:00	PtChev_3	Baseline	MARINE	< 10 cfu/100mL	10			< 10 cfu/100ml	10						
10/35950	PtChev_4_Base_20101129	29/11/2010 10:00	PtChev_4	Baseline	MARINE	< 10 cfu/100mL	10			< 10 cfu/100ml	10				Negative		
10/36340	MEO_DS_Base_20101201	1/12/2010 9:00	Meo_DS	Baseline (Retest for Norovirus)	FW	590 cfu/100mL	590			570 cfu/100ml	570	2 MPN/L	2	Yes	Negative	47 mg/L CaCO	46.66
10/36340	Meo_SS 2010121	1/12/2010 0:00	Meo_SS	Baseline Overflow	FW	1280 cfu/100mL	1280	1480 cfu/100mL	1480							79 mg/L CaCO	79.43
10/39697	PtChev_4_Base_20101224	24/12/2010 9:10	PtChev_4	Baseline	MARINE	< 2 cfu/100mL	2	< 10 MPN/100mL	10						Negative	110 mg/L CaCO	110.14
10/39698	PtChev_3_Base_20101224	24/12/2010 9:10	PtChev_3	Baseline	MARINE	< 2 cfu/100mL	2	< 10 MPN/100mL	10							126 mg/L CaCO	125.94
10/39701	MEO_HB_Base_20101224	24/12/2010 9:10	Meo_HB	Baseline	FW/MARINE	153 cfu/100mL	153	110 MPN/100mL	110							109 mg/L CaCO	108.8
10/39702	MEO_MID_Base_20101224	24/12/2010 9:10	Meo_MID	Baseline	FW	590 cfu/100mL	590	173 MPN/100mL	173							55 mg/L CaCO	54.84
10/39703	MEO_DS_Base_20101224	24/12/2010 9:10	Meo_DS	Baseline	FW	700 cfu/100mL	700	144 MPN/100mL	144			5 MPN/L	5	Yes	Positive	47 mg/L CaCO	46.66
10/39706	MEO_US_Base_20101224	24/12/2010 9:10	Meo_US	Baseline	FW	3900 cfu/100mL	3900	7270 MPN/100mL	7270							61 mg/L CaCO	60.65
10/39707	PtChev_1_Base_20101224	24/12/2010 9:10	PtChev_1	Baseline	MARINE	7 cfu/100mL	7	< 10 MPN/100mL	10							119 mg/L CaCO	119.15
10/39708	PtChev_2_Base_20101224	24/12/2010 9:10	PtChev_2	Baseline	MARINE	< 2 cfu/100mL	2	10 MPN/100mL	10						Positive	118 mg/L CaCO	118.21
10/39709	Meo_OF_Base_20101224	24/12/2010 9:40	Meo_OF	Baseline Overflow	OF	1240000 cfu/100mL	1240000	> 24196 MPN/100mL	24196							238 mg/L CaCO	238.36
11/03043	PtChev_1_Base_20110127	27/01/2011 9:10	PtChev_1	Baseline	MARINE	< 2 cfu/100mL	2	< 10 MPN/100mL	10							110 mg/L CaCO	110.25
11/03062	PtChev_2_Base_20110127	27/01/2011 9:10	PtChev_2	Baseline	MARINE	< 2 cfu/100mL	2	< 10 MPN/100mL	10						Negative	108 mg/L CaCO	108.27
11/03063	PtChev_3_Base_20110127	27/01/2011 9:10	PtChev_3	Baseline	MARINE	3 cfu/100mL	3	< 10 MPN/100mL	10							109 mg/L CaCO	108.73
11/03064	PtChev_4_Base_20110127	27/01/2011 9:10	PtChev_4	Baseline	MARINE	< 2 cfu/100mL	2	< 10 MPN/100mL	10							109 mg/L CaCO	108.91
11/03092	MEO_MID_Base_20110127	27/01/2011 9:10	Meo_MID	Baseline	FW	590 cfu/100mL	590	275 MPN/100mL	275							50 mg/L CaCO	49.82
11/03093	MEO_US_Base_20110127	27/01/2011 9:10	Meo_US	Baseline	FW	2900 cfu/100mL	2900	12033 MPN/100mL	12033							46 mg/L CaCO	45.67
11/03094	MEO_HB_Base_20110127	27/01/2011 9:10	Meo_HB	Baseline	FW/MARINE	620 cfu/100mL	620	52 MPN/100mL	52							53 mg/L CaCO	53.13
11/03095	MEO_DS_Base_20110127	27/01/2011 9:10	Meo_DS	Baseline	FW	690 cfu/100mL	690	218 MPN/100mL	218			4 MPN/L	4.1	Yes	Negative	46 mg/L CaCO	45.89
11/03096	Meo_OF_Base_20110127	27/01/2011 0:00	Meo_OF	Baseline Overflow	OF	3800000 cfu/100mL	3800000	241960 MPN/100mL	241960							199 mg/L CaCO	198.5
11/03102	Meo_OF_RCT_Base_2011012	27/01/2011 0:00	Meo_OF_RCT	Baseline Overflow	FW	5800 cfu/100mL	5800	6131 MPN/100mL	6131							69 mg/L CaCO	69.29
11/03493	MEO_SW_WW_1_000	28/01/2011 17:50	Meo_SW	Wet Weather	SWN	2600 cfu/100mL	2600	1723 MPN/100mL	1723			< 1 MPN/L	1	Yes	Negative	13 mg/L CaCO	13.03
11/03493	MEO_SW_WW_1_010	28/01/2011 18:00	Meo_SW	Wet Weather	SWN	1600 cfu/100mL	1600	932 MPN/100mL	932			< 1 MPN/L	1	Yes	Negative	30 mg/L CaCO	30.38
11/03493	MEO_SW_WW_1_020	28/01/2011 18:10	Meo_SW	Wet Weather	SWN	2700 cfu/100mL	2700	1376 MPN/100mL	1376							66 mg/L CaCO	65.55
11/03493	MEO_SW_WW_1_030	28/01/2011 18:20	Meo_SW	Wet Weather	SWN	2400 cfu/100mL	2400	2247 MPN/100mL	2247							17 mg/L CaCO	16.79
11/03493	MEO_SW_WW_1_060	28/01/2011 18:50	Meo_SW	Wet Weather	SWN	1400 cfu/100mL	1400	1234 MPN/100mL	1234							13 mg/L CaCO	13.06
11/03493	MEO_SW_WW_1_120	28/01/2011 19:50	Meo_SW	Wet Weather	SWN	1500 cfu/100mL	1500	1850 MPN/100mL	1850							35 mg/L CaCO	34.77
11/03494	MEO_CSO_WW_1_000	28/01/2011 17:50	Meo_CSO	Wet Weather	CSO	82000 cfu/100mL	82000	166400 MPN/100mL	166400			< 1 MPN/L	1	Yes	Positive	37 mg/L CaCO	36.88
11/03494	MEO_CSO_WW_1_010	28/01/2011 18:00	Meo_CSO	Wet Weather	CSO	88000 cfu/100mL	88000	75400 MPN/100mL	75400			< 1 MPN/L	1	Yes	Positive	33 mg/L CaCO	32.72
11/03494	MEO_CSO_WW_1_020	28/01/2011 18:10	Meo_CSO	Wet Weather	CSO	64000 cfu/100mL	64000	79400 MPN/100mL	79400							31 mg/L CaCO	30.63
11/03494	MEO_CSO_WW_1_030	28/01/2011 18:20	Meo_CSO	Wet Weather	CSO	50000 cfu/100mL	50000	127400 MPN/100mL	127400							32 mg/L CaCO	31.69
11/03494	MEO_CSO_WW_1_060	28/01/2011 18:50	Meo_CSO	Wet Weather	CSO	54000 cfu/100mL	54000	224700 MPN/100mL	224700							31 mg/L CaCO	31.2
11/03494	MEO_CSO_WW_1_120	28/01/2011 19:40	Meo_CSO	Wet Weather	CSO	540000 cfu/100mL	540000	37900 MPN/100mL	37900							31 mg/L CaCO	31.33
11/03495	PtChev2_WW_1-A	28/01/2011 21:08	PtChev_2	Wet Weather	MARINE	27 cfu/100mL	27	10 MPN/100mL	10							99 mg/L CaCO	99.1
11/03495	PtChev2_WW_1-B	28/01/2011 21:48	PtChev_2	Wet Weather	MARINE	260 cfu/100mL	260	323 MPN/100mL	323							100 mg/L CaCO	99.86
11/03495	PtChev2_WW_1-C	28/01/2011 22:24	PtChev_2	Wet Weather	MARINE	360 cfu/100mL	360	487 MPN/100mL	487						Negative	99 mg/L CaCO	99.39
11/03495	PtChev2_WW_1-D	28/01/2011 23:03	PtChev_2	Wet Weather	MARINE	6800 cfu/100mL	6800	4352 MPN/100mL	4352						Negative	250 mg/L CaCO	249.58
11/03495	PtChev2_WW_1-E	29/01/2011 23:40	PtChev_2	Wet Weather	MARINE	1800 cfu/100mL	1800	2495 MPN/100mL	2495							102 mg/L CaCO	101.52
11/03495	PtChev2_WW_1-F	29/01/2011 0:20	PtChev_2	Wet Weather	MARINE	2800 cfu/100mL	2800	934 MPN/100mL	934							52 mg/L CaCO	51.97
11/03496	PtChev3_WW_1-A	28/01/2011 20:58	PtChev_3	Wet Weather	MARINE	34 cfu/100mL	34	85 MPN/100mL	85							99 mg/L CaCO	98.56
11/03496	PtChev3_WW_1-B	28/01/2011 21:39	PtChev_3	Wet Weather	MARINE	9 cfu/100mL	9	20 MPN/100mL	20							149 mg/L CaCO	148.61
11/03496	PtChev3_WW_1-C	28/01/2011 22:16	PtChev_3	Wet Weather	MARINE	9 cfu/100mL	9	41 MPN/100mL	41							103 mg/L CaCO	102.96
11/03496	PtChev3_WW_1-D	28/01/2011 22:55	PtChev_3	Wet Weather	MARINE	4000 cfu/100mL	4000	2143 MPN/100mL	2143							106 mg/L CaCO	105.97
11/03496	PtChev3_WW_1-E	29/01/2011 23:32	PtChev_3	Wet Weather	MARINE	1400 cfu/100mL	1400	987 MPN/100mL	987							108 mg/L CaCO	107.86
11/03496	PtChev3_WW_1-F	29/01/2011 0:14	PtChev_3	Wet Weather	MARINE	2500 cfu/100mL	2500	1126 MPN/100mL	1126							103 mg/L CaCO	102.51
11/03497	PtChev4_WW_1-A	28/01/2011 20:45	PtChev_4	Wet Weather	MARINE	27 cfu/100mL	27	52 MPN/100mL	52							106 mg/L CaCO	105.55
11/03497	PtChev4_WW_1-B	28/01/2011 21:30	PtChev_4	Wet Weather	MARINE	18 cfu/100mL	18	31 MPN/100mL	31							102 mg/L CaCO	101.92
11/03497	PtChev4_WW_1-C	28/01/2011 22:08	PtChev_4	Wet Weather	MARINE	6 cfu/100mL	6	10 MPN/100mL	10						Negative	102 mg/L CaCO	102.37
11/03497	PtChev4_WW_1-D	28/01/2011 22:50	PtChev_4	Wet Weather	MARINE	770 cfu/100mL	770	538 MPN/100mL	538						Negative	98 mg/L CaCO	97.75
11/03497	PtChev4_WW_1-E	29/01/2011 23:25	PtChev_4	Wet Weather	MARINE	2200 cfu/100mL	2200	1169 MPN/100mL	1169							104 mg/L CaCO	103.51
11/03497	PtChev4_WW_1-F	29/01/2011 0:10	PtChev_4	Wet Weather	MARINE	780 cfu/100mL	780	404 MPN/100mL	404							103 mg/L CaCO	102.61
11/03498	Meo_HB_WW_1-000	28/01/2011 17:50	Meo_HB	Wet Weather	FW/MARINE	3600 cfu/100mL	3600	1935 MPN/100mL	1935							61 mg/L CaCO	60.7
11/03498	Meo_HB_WW_1-030	28/01/2011 18:20	Meo_HB	Wet Weather	FW/MARINE	39000 cfu/100mL	39000	12997 MPN/100mL	12997							51 mg/L CaCO	51.32
11/03498	Meo_HB_WW_1-060	28/01/2011 18:50	Meo_HB	Wet Weather	FW/MARINE	9000 cfu/100mL	9000	4611 MPN/100mL	4611							48 mg/L CaCO	47.99
11/03498	Meo_HB_WW_1-120	28/01/2011 19:50	Meo_HB	Wet Weather	FW/MARINE	430000 cfu/100mL	430000	31500 MPN/100mL	31500							36 mg/L CaCO	35.9
11/03498	Meo_HB_WW_1-180	28/01/2011 20:50	Meo_HB	Wet Weather	FW/MARINE	240000 cfu/100mL	240000	40800 MPN/100mL	40800							31 mg/L CaCO	30.54
11/03498	Meo_HB_WW_1-240	28/01/2011 21:50	Meo_HB	Wet Weather	FW/MARINE	410000 cfu/100mL	410000	61300 MPN/100mL	61300							25 mg/L CaCO	24.84
11/03499	PtChev1_WW_1-A	28/01/2011 21:17	PtChev_1	Wet Weather	MARINE	310 cfu/100mL	310	20 MPN/100mL	20							105 mg/L CaCO	105.33
11/03499	PtChev1_WW_1-B	28/01/2011 21:56	PtChev_1	Wet Weather	MARINE	370 cfu/100mL	370	473 MPN/100mL	473							106 mg/L CaCO	105.56
11/03499	PtChev1_WW_1-C	28/01/2011 22:32	PtChev_1	Wet Weather	MARINE	2500 cfu/100mL	2500	1126 MPN/100mL	1126							87 mg/L CaCO	86.69
11/03499	PtChev1_WW_1-D	28/01/2011 23:10	PtChev_1	Wet Weather	MARINE	1310 cfu/100mL	1310	906 MPN/100mL	906							94 mg/L CaCO	93.82
11/03499	PtChev1_WW_1-E	29/01/2011 23:45	PtChev_1	Wet Weather	MARINE	1340 cfu/100mL	1340	2014 MPN/100mL	2014							101 mg/L CaCO	101.48
11/03499	PtChev1_WW_1-F	29/01/2011 0:26	PtChev_1	Wet Weather	MARINE	4800 cfu/100mL	4800	906 MPN/100mL	906							93 mg/L CaCO	93.36
11/03505	MEO_DS_WW_1_000	28/01/2011 17:50	Meo_DS	Wet Weather	FW	5600 cfu/100mL	5600	2098 MPN/100mL	2098							40 mg/L CaCO	39.67
11/03505	MEO_DS_WW_1_030	28/01/2011 18:20	Meo_DS	Wet Weather	FW	6000 cfu/100mL	6000	3873 MPN/100mL	3873			< 1 MPN/L	1	Yes	Positive	40 mg/L CaCO	39.67
11/03505	MEO_DS_WW_1_060	28/01/2011 18:50	Meo_DS	Wet Weather	FW	3500 cfu/100mL	3500	15531 MPN/100mL	15531			< 1 MPN/L	1	Yes	Positive	32 mg/L CaCO	31.94
11/03505	MEO_DS_WW_1_120	28/01/2011 19:50	Meo_DS	Wet Weather	FW	360000 cfu/100mL	360000	51200 MPN/100mL	51200							31 mg/L CaCO	31.19
11/03505	MEO_DS_WW_1_180	28/01/2011 20:50	Meo_DS	Wet Weather	FW	310000 cfu/100mL	310000	51200 MPN/100mL	51200							31 mg/L CaCO	31.43
11/03505	MEO_DS_WW_1_240	28/01/2011 21:50	Meo_DS	Wet Weather	FW	250000 cfu/100mL	250000	37900 MPN/100mL	37900							17 mg/L CaCO	17
11/03509	Meo_US_WW_1-000	28/01/2011 17:50	Meo_US	Wet Weather	FW	6700 cfu/100mL	6700	14136 MPN/100mL	14136							10 mg/L CaCO	10.35
11/03509	Meo_US_WW_1-030	28/01/2011 18:20	Meo_US	Wet Weather	FW	4000 cfu/100mL	4000	3448 MPN/100mL	3448							23 mg/L CaCO	23.25
11/03509	Meo_US_WW_1-060	28/01/2011 18:50	Meo_US	Wet Weather	FW	4800 cfu/100mL	4800	5475 MPN/100mL	5475							19 mg/L CaCO	18.5
11/03509	Meo_US_WW_1-120	28/01/2011 19:50	Meo_US	Wet Weather	FW	4900 cfu/100mL	4900	3255 MPN/100mL	3255							30 mg/L CaCO	29.9
11/03509	Meo_US_WW_1-180	28/01/2011 20:50	Meo_US	Wet Weather	FW	5300 cfu/100mL	5300	9804 MPN/100mL	9804							15 mg/L CaCO	14.99
11/03509	Meo_US_WW_1-240	28/01/2011 21:50	Meo_US	Wet Weather	FW	4100 cfu/100mL	4100	5172 MPN/100mL	5172							26 mg/L CaCO	26.47
11/14097	MEO_SW_WW_2_000	16/04/2011 8:55	Meo_SW	Wet Weather	SWN	7000 cfu/100mL	7000	3255 MPN/100mL	3255			< 1 MPN/L	1	Yes	Negative	37 mg/L CaCO	37.19
11/14097	MEO_SW_WW_2_010	16/04/2011 9:05	Meo_SW	Wet Weather	SWN	4400 cfu/100mL	4400	3255 MPN/100mL	3255			< 1 MPN/L	1	Yes	Negative	39 mg/L CaCO	39.39
11/14097	MEO_SW_WW_2_020	16/04/2011 9:15	Meo_SW	Wet Weather	SWN	5600 cfu/100mL	5600	2909 MPN/100mL	2909							26 mg/L CaCO	25.6
11/14097	MEO_SW_WW_2_030	16/04/2011 9:25	Meo_SW	Wet Weather	SWN	4000 cfu/100mL	4000	2098 MPN/100mL	2098							22 mg/L CaCO	22.44
11/14097	MEO_SW_WW_2_060	16/04/2011 9:55	Meo_SW	Wet Weather	SWN	4800 cfu/100mL	4800	3255 MPN/100mL	3255							24 mg/L CaCO	24.23
11/14097	MEO_SW_WW_2_120	16/04/2011 10:55	Meo_SW	Wet Weather	SWN	2300 cfu/100mL	2300	3873 MPN/100mL	3873							10 mg/L CaCO	9.79
11/14099	MEO_CSO_WW_2_000	16/04/2011 8:55	Meo_CSO	Wet Weather	CSO	2270000 cfu/100mL	2270000	365400 MPN/100mL	365400			< 1 MPN/L	1	Yes	Positive	73 mg/L CaCO	72.91
11/14099	MEO_CSO_WW_2_010	16/04/2011 9:05	Meo_CSO	Wet Weather	CSO	1780000 cfu/100mL	1780000	325500 MPN/100mL	325500			< 1 MPN/L	1	Yes	Negative	82 mg/L CaCO	82.46
11/14099	MEO_CSO_WW_2_020	16/04/2011 9:15	Meo_CSO	Wet Weather	CSO	1350000 cfu/100mL	1350000	579400 MPN/100mL	579400							62 mg/L CaCO	61.99
11/14099	MEO_CSO_WW_2_030	16/04/2011 9:25	Meo_CSO	Wet Weather	CSO	1130000 cfu/100mL	1130000	325500 MPN/100mL	325500							65 mg/L CaCO	65.28
11/14099	MEO_CSO_WW_2_060	16/04/2011 9:55	Meo_CSO	Wet Weather	CSO	960000 cfu/100mL	960000	190400 MPN/100mL	190400							67 mg/L CaCO	66.68
11/14100	Meo_US_WW_2-000	16/04/2011 8:55	Meo_US	Wet Weather	FW	12200 cfu/100mL	12200	7701 MPN/100mL	7701							16 mg/L CaCO	15.79
11/14100	Meo_US_WW_2-030	16/04/2011 9:25	Meo_US	Wet Weather	FW	7200 cfu/100mL	7200	2755 MPN/100mL	2755							15 mg/L CaCO	14.58
11/14100	Meo_US_WW_2-060	16/04/2011 9:55	Meo_US	Wet Weather	FW	54000 cfu/100mL	54000	5794 MPN/100mL	5794							22 mg/L CaCO	21.99
11/14100	Meo_US_WW_2-120	16/04/2011 10:55	Meo_US	Wet Weather	FW	6700 cfu/100mL	6700	2359 MPN/100mL	2359							16 mg/L CaCO	15.75
11/14100	Meo_US_WW_2-180	16/04/2011 11:55	Meo_US	Wet Weather	FW	9700 cfu/100mL	9700	11199 MPN/100mL	11199							14 mg/L CaCO	14.46
11/14100	Meo_US_WW_2-240	16/04/2011 12:55	Meo_US	Wet Weather	FW	4200 cfu/100mL	4200	5475 MPN/100mL	5475							20 mg/L CaCO	19.92
11/14101	Meo_HB_WW_2-000	16/04/2011 8:55	Meo_HB	Wet Weather	FW/MARINE	7700 cfu/100mL	7700	4106 MPN/100mL	4106							67 mg/L CaCO	66.66
11/14101	Meo_HB_WW_2-030	16/04/2011 9:25	Meo_HB	Wet Weather	FW/MARINE	25000 cfu/100mL	25000	19863 MPN/100mL	19863							60 mg/L CaCO	60.25
11/14101	Meo_HB_WW_2-060	16/04/2011 9:55	Meo_HB	Wet Weather	FW/MARINE	49000 cfu/100mL	49000	24196 MPN/100mL	24196							58 mg/L CaCO	57.79
11/14101	Meo_HB_WW_2-120	16/04/2011 10:55	Meo_HB	Wet Weather	FW/MARINE	7500 cfu/100mL	7500	6488 MPN/100mL	6488							54 mg/L CaCO	54.12
11/14101	Meo_HB_WW_2-180	16/04/2011 11:55	Meo_HB	Wet Weather	FW/MARINE	63000 cfu/100mL	63000	23100 MPN/100mL	23100							23 mg/L CaCO	23.37
11/14101	Meo_HB_WW_2-240	16/04/2011 12:55	Meo_HB	Wet Weather	FW/MARINE	680000 cfu/100mL	680000	125900 MPN/100mL	125900							36 mg/L CaCO	36.29
11/14102	MEO_DS_WW_2_000	16/04/2011 8:55	Meo_DS	Wet Weather	FW	960 cfu/100mL	960	420 MPN/100mL	420							48 mg/L CaCO	48.35
11/14102	MEO_DS_WW_2_030	16/04/2011 9:25	Meo_DS	Wet Weather	FW	6000 cfu/100mL	6000	987 MPN/100mL	987			3 MPN/L	3	Yes	Positive	46 mg/L CaCO	45.86
11/14102	MEO_DS_WW_2_060	16/04/2011 9:55	Meo_DS	Wet Weather	FW	8300 cfu/100mL	8300	2224 MPN/100mL	2224			< 1 MPN/L	1	Yes	Positive	43 mg/L CaCO	42.83
11/14102	MEO_DS_WW_2_120	16/04/2011 10:55	Meo_DS	Wet Weather	FW	179000 cfu/100mL	179000	66300 MPN/100mL	66300							32 mg/L CaCO	31.56
11/14102	MEO_DS_WW_2_180	16/04/2011 11:55	Meo_DS	Wet Weather	FW	271000 cfu/100mL	271000	71700 MPN/100mL	71700							35 mg/L CaCO	35.33
11/14102	MEO_DS_WW_2_240	16/04/2011 12:55	Meo_DS	Wet Weather	FW	440000 cfu/100mL	440000	86700 MPN/100mL	86700							21 mg/L CaCO	21.18
11/14112	PtChev1_WW_2-A	16/04/2011 12:12	PtChev_1	Wet Weather	MARINE	< 10 cfu/100mL	10	20 MPN/100mL	20							106 mg/L CaCO	105.74
11/14112	PtChev1_WW_2-B	16/04/2011 12:50	PtChev_1	Wet Weather	MARINE	< 10 cfu/100mL	10	< 10 MPN/100mL	10							113 mg/L CaCO	112.75
11/14112	PtChev1_WW_2-C	16/04/2011 13:30	PtChev_1	Wet Weather	MARINE	530 cfu/100mL	530	990 MPN/100mL	990							106 mg/L CaCO	105.71
11/14112	PtChev1_WW_2-D	16/04/2011 14:10	PtChev_1	Wet Weather	MARINE	560 cfu/100mL	560	1401 MPN/100mL	1401							104 mg/L CaCO	104
11/14112	PtChev1_WW_2-E	16/04/2011 14:50	PtChev_1	Wet Weather	MARINE	135 cfu/100mL	135	762 MPN/100mL	762							106 mg/L CaCO	105.83
11/14112	PtChev1_WW_2-F	16/04/2011 15:30	PtChev_1	Wet Weather	MARINE	54 cfu/100mL	54	961 MPN/100mL	961							110 mg/L CaCO	109.75
11/14113	PtChev2_WW_2-A	16/04/2011 12:08	PtChev_2	Wet Weather	MARINE	45 cfu/100mL	45	< 10 MPN/100mL	10							105 mg/L CaCO	104.94
11/14113	PtChev2_WW_2-B	16/04/2011 12:44	PtChev_2	Wet Weather	MARINE	9 cfu/100mL	9	10 MPN/100mL	10					Yes	Negative	113 mg/L CaCO	112.76
11/14113	PtChev2_WW_2-C	16/04/2011 13:25	PtChev_2	Wet Weather	MARINE	9 cfu/100mL	9	10 MPN/100mL	10					Yes	Negative	115 mg/L CaCO	115.04
11/14113	PtChev2_WW_2-D	16/04/2011 14:05	PtChev_2	Wet Weather	MARINE	470 cfu/100mL	470	794 MPN/100mL	794							107 mg/L CaCO	107.04
11/14113	PtChev2_WW_2-E	16/04/2011 14:45	PtChev_2	Wet Weather	MARINE	63 cfu/100mL	63	52 MPN/100mL	52							119 mg/L CaCO	119.15
11/14113	PtChev2_WW_2-F	16/04/2011 15:25	PtChev_2	Wet Weather	MARINE	< 10 cfu/100mL	10	< 10 MPN/100mL	10							109 mg/L CaCO	109.13
11/14114	PtChev3_WW_2-A	16/04/2011 12:00	PtChev_3	Wet Weather	MARINE	730 cfu/100mL	730	880 MPN/100mL	880							112 mg/L CaCO	111.96
11/14114	PtChev3_WW_2-B	16/04/2011 12:35	PtChev_3	Wet Weather	MARINE	9 cfu/100mL	9	< 10 MPN/100mL	10							112 mg/L CaCO	112.19
11/14114	PtChev3_WW_2-C	16/04/2011 13:20	PtChev_3	Wet Weather	MARINE	9 cfu/100mL	9	< 10 MPN/100mL	10							110 mg/L CaCO	110
11/14114	PtChev3_WW_2-D	16/04/2011 14:00	PtChev_3	Wet Weather	MARINE	63 cfu/100mL	63	63 MPN/100mL	63							110 mg/L CaCO	109.64
11/14114	PtChev3_WW_2-E	16/04/2011 14:40	PtChev_3	Wet Weather	MARINE	310 cfu/100mL	310	548 MPN/100mL	548							104 mg/L CaCO	103.93
11/14114	PtChev3_WW_2-F	16/04/2011 15:20	PtChev_3	Wet Weather	MARINE	< 10 cfu/100mL	10	< 10 MPN/100mL	10							114 mg/L CaCO	114.02
11/14115	PtChev4_WW_2-A	16/04/2011 11:50	PtChev_4	Wet Weather	MARINE	960 cfu/100mL	960	2014 MPN/100mL	2014							102 mg/L CaCO	102.17
11/14115	PtChev4_WW_2-B	16/04/2011 12:30	PtChev_4	Wet Weather	MARINE	360 cfu/100mL	360	479 MPN/100mL	479					Yes	Negative	105 mg/L CaCO	104.63
11/14115	PtChev4_WW_2-C	16/04/2011 13:12	PtChev_4	Wet Weather	MARINE	9 cfu/100mL	9	< 10 MPN/100mL	10					Yes	Negative	107 mg/L CaCO	106.84
11/14115	PtChev4_WW_2-D	16/04/2011 13:55	PtChev_4	Wet Weather	MARINE	54 cfu/100mL	54	62 MPN/100mL	62							107 mg/L CaCO	106.89
11/14115	PtChev4_WW_2-E	16/04/2011 14:35	PtChev_4	Wet Weather	MARINE	81 cfu/100mL	81	63 MPN/100mL	63							108 mg/L CaCO	108.46
11/14115	PtChev4_WW_2-F	16/04/2011 15:15	PtChev_4	Wet Weather	MARINE	< 10 cfu/100mL	10	< 10 MPN/100mL	10							114 mg/L CaCO	113.78

Sample Name	Test Result Alkalinity carbonate	Decimal Result * refer note Alkalinity carbonate mg/L CO3	Test Result Alkalinity bicarbonate	Decimal Result * refer note Alkalinity bicarbonate mg/L HCO3	Test Result Biochemical oxygen demand (CBOD5)	Decimal Result * refer note Biochemical oxygen demand (CBOD5) mg/L O	Test Result Chemical oxygen demand	Decimal Result * refer note Chemical oxygen demand mg/L O	Membrane Filtration	Test Result Ammonia Nitrogen (NH3 + NH4)	Decimal Result * refer note Ammonia Nitrogen (NH3 + NH4) mg/L N	Test Result Nitrate Nitrogen (Calculation)	Decimal Result * refer note Nitrate Nitrogen (Calculation) mg/L N	Test Result Nitrite Nitrogen by SFA/Colorimetry	Decimal Result * refer note Nitrite Nitrogen by SFA/Colorimetry mg/L N	Test Result Nitrate & Nitrite Nitrogen by Cd Reduction/SFA
MEO_DS_Base_20101129					< 2.0 mg/L O	2	5.7 mg/L O	5.71	Yes	0.037 mg/L N	0.037					
MEO_HB_Base_20101129					< 2.0 mg/L O	2			Yes	0.514 mg/L N	0.514	2.489 mg/L N	2.489	0.461 mg/L N	0.461	2.950 mg/L N
MEO_MID_Base_20101129					< 2.0 mg/L O	2	9. mg/L O	8.98	Yes	0.048 mg/L N	0.048					
MEO_US_Base_20101129					3.2 mg/L O	3.2	5.7 mg/L O	5.71	Yes	0.15 mg/L N	0.15					
PtChev_1_Base_20101129					< 2.0 mg/L O	2			Yes	0.017 mg/L N	0.017	0.000 mg/L N	0	< 0.002 mg/L N	0.002	< 0.002 mg/L N
PtChev_2_Base_20101129					< 2.0 mg/L O	2			Yes	0.013 mg/L N	0.013	0.007 mg/L N	0.007	0.002 mg/L N	0.002	0.009 mg/L N
PtChev_3_Base_20101129					< 2.0 mg/L O	2			Yes	0.014 mg/L N	0.014	0.008 mg/L N	0.008	< 0.002 mg/L N	0.002	0.010 mg/L N
PtChev_4_Base_20101129					< 2.0 mg/L O	2			Yes	0.012 mg/L N	0.012	0.000 mg/L N	0	< 0.002 mg/L N	0.002	< 0.002 mg/L N
MEO_DS_Base_20101201	< 1 mg/L CC	1	57 mg/L HCO3	57	< 2.0 mg/L O	2										
Meo_SS 2010121					< 2.0 mg/L O	2	12.2 mg/L O	12.2		0.747 mg/L N	0.747					
PtChev_4_Base_20101224	27 mg/L CO	27	80 mg/L HCO3	80					Yes	< 0.005 mg/L N	0.005					0.003 mg/L N
PtChev_3_Base_20101224	23 mg/L CO	23	107 mg/L HCO	107					Yes	< 0.005 mg/L N	0.005					0.003 mg/L N
MEO_HB_Base_20101224	< 1 mg/L CC	1	133 mg/L HCO	133					Yes	0.018 mg/L N	0.018					0.133 mg/L N
MEO_MID_Base_20101224	< 1 mg/L CC	1	67 mg/L HCO3	67	< 2.0 mg/L O	2	74 mg/L O	74	Yes	0.06 mg/L N	0.06					
MEO_DS_Base_20101224	< 1 mg/L CC	1	57 mg/L HCO3	57	< 2.0 mg/L O	2	95 mg/L O	95	Yes	0.072 mg/L N	0.072					
MEO_US_Base_20101224	< 1 mg/L CC	1	74 mg/L HCO3	74	< 2.0 mg/L O	2	105 mg/L O	105	Yes	0.109 mg/L N	0.109					
PtChev_1_Base_20101224	24 mg/L CO	24	96 mg/L HCO3	96					Yes	< 0.005 mg/L N	0.005					0.006 mg/L N
PtChev_2_Base_20101224	24 mg/L CO	24	96 mg/L HCO3	96					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
Meo_OF_Base_20101224	< 1 mg/L CC	1	291 mg/L HCO	291	220.0 mg/L O	220	425 mg/L O	425	Yes	30.306 mg/L N	30.306					
PtChev_1_Base_20110127	< 1 mg/L CC	1	135 mg/L HCO	135					Yes	0.011 mg/L N	0.011					0.003 mg/L N
PtChev_2_Base_20110127	29 mg/L CO	29	74 mg/L HCO3	74					Yes	0.010 mg/L N	0.01					< 0.002 mg/L N
PtChev_3_Base_20110127	< 1 mg/L CC	1	133 mg/L HCO	133					Yes	0.007 mg/L N	0.007					0.002 mg/L N
PtChev_4_Base_20110127	< 1 mg/L CC	1	133 mg/L HCO	133					Yes	0.006 mg/L N	0.006					< 0.002 mg/L N
MEO_MID_Base_20110127	< 1 mg/L CC	1	61 mg/L HCO3	61	< 2.0 mg/L O	2	51 mg/L O	51	Yes	0.087 mg/L N	0.087					
MEO_US_Base_20110127	< 1 mg/L CC	1	56 mg/L HCO3	56	< 2.0 mg/L O	2	3.3 mg/L O	3.26	Yes	0.307 mg/L N	0.307					
MEO_HB_Base_20110127	< 1 mg/L CC	1	65 mg/L HCO3	65	< 2.0 mg/L O	2	143 mg/L O	143	Yes	0.162 mg/L N	0.162					3.210 mg/L N
MEO_DS_Base_20110127	< 1 mg/L CC	1	56 mg/L HCO3	56	< 2.0 mg/L O	2	31 mg/L O	31	Yes	0.043 mg/L N	0.043					
Meo_OF_Base_20110127	< 1 mg/L CC	1	242 mg/L HCO	242	125.0 mg/L O	125	285 mg/L O	285	Yes	10.5 mg/L N	10.5					
Meo_OF_RCT_Base_20110127	< 1 mg/L CC	1	85 mg/L HCO3	85	10.0 mg/L O	10	169 mg/L O	169	Yes	0.177 mg/L N	0.177					
MEO_SW_WW_1_000	< 1 mg/L CC	1	16 mg/L HCO3	16	4.4 mg/L O	4.4	54 mg/L O	54	Yes	0.119 mg/L N	0.119					
MEO_SW_WW_1_010	< 1 mg/L CC	1	37 mg/L HCO3	37	4.5 mg/L O	4.5	44 mg/L O	44	Yes	0.105 mg/L N	0.105					
MEO_SW_WW_1_020	< 1 mg/L CC	1	80 mg/L HCO3	80	3.4 mg/L O	3.4	73 mg/L O	73	Yes	0.106 mg/L N	0.106					
MEO_SW_WW_1_030	< 1 mg/L CC	1	20 mg/L HCO3	20	3.8 mg/L O	3.8	82 mg/L O	82	Yes	0.106 mg/L N	0.106					
MEO_SW_WW_1_060	< 1 mg/L CC	1	16 mg/L HCO3	16	3.0 mg/L O	3	48 mg/L O	48	Yes	0.089 mg/L N	0.089					
MEO_SW_WW_1_120	< 1 mg/L CC	1	42 mg/L HCO3	42	< 2.0 mg/L O	2	57 mg/L O	57	Yes	0.079 mg/L N	0.079					
MEO_CSO_WW_1_000	< 1 mg/L CC	1	45 mg/L HCO3	45	87.0 mg/L O	87	139 mg/L O	139	Yes	2.7 mg/L N	2.7					
MEO_CSO_WW_1_010	< 1 mg/L CC	1	40 mg/L HCO3	40	60.0 mg/L O	60	120 mg/L O	120	Yes	2.8 mg/L N	2.8					
MEO_CSO_WW_1_020	< 1 mg/L CC	1	37 mg/L HCO3	37	55.0 mg/L O	55	145 mg/L O	145	Yes	2.3 mg/L N	2.3					
MEO_CSO_WW_1_030	< 1 mg/L CC	1	39 mg/L HCO3	39	50.0 mg/L O	50	135 mg/L O	135	Yes	2.3 mg/L N	2.3					
MEO_CSO_WW_1_060	< 1 mg/L CC	1	38 mg/L HCO3	38	57.0 mg/L O	57	101 mg/L O	101	Yes	2.1 mg/L N	2.1					
MEO_CSO_WW_1_120	< 1 mg/L CC	1	38 mg/L HCO3	38	60.0 mg/L O	60	129 mg/L O	129	Yes	2.3 mg/L N	2.3					
PtChev2_WW_1-A	< 1 mg/L CC	1	121 mg/L HCO	121					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
PtChev2_WW_1-B	< 1 mg/L CC	1	122 mg/L HCO	122					Yes	< 0.005 mg/L N	0.005					0.045 mg/L N
PtChev2_WW_1-C	< 1 mg/L CC	1	121 mg/L HCO	121					Yes	< 0.005 mg/L N	0.005					0.035 mg/L N
PtChev2_WW_1-D	< 1 mg/L CC	1	304 mg/L HCO	304					Yes	< 0.005 mg/L N	0.005					0.022 mg/L N
PtChev2_WW_1-E	< 1 mg/L CC	1	124 mg/L HCO	124					Yes	0.011 mg/L N	0.011					0.028 mg/L N
PtChev2_WW_1-F	< 1 mg/L CC	1	63 mg/L HCO3	63					Yes	< 0.005 mg/L N	0.005					0.029 mg/L N
PtChev3_WW_1-A	< 1 mg/L CC	1	120 mg/L HCO	120					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
PtChev3_WW_1-B	< 1 mg/L CC	1	181 mg/L HCO	181					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
PtChev3_WW_1-C	< 1 mg/L CC	1	126 mg/L HCO	126					Yes	< 0.005 mg/L N	0.005					0.002 mg/L N
PtChev3_WW_1-D	< 1 mg/L CC	1	129 mg/L HCO	129					Yes	< 0.005 mg/L N	0.005					0.048 mg/L N
PtChev3_WW_1-E	< 1 mg/L CC	1	132 mg/L HCO	132					Yes	< 0.005 mg/L N	0.005					0.019 mg/L N
PtChev3_WW_1-F	< 1 mg/L CC	1	125 mg/L HCO	125					Yes	< 0.005 mg/L N	0.005					0.013 mg/L N
PtChev4_WW_1-A	< 1 mg/L CC	1	129 mg/L HCO	129					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
PtChev4_WW_1-B	< 1 mg/L CC	1	124 mg/L HCO	124					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
PtChev4_WW_1-C	< 1 mg/L CC	1	125 mg/L HCO	125					Yes	0.015 mg/L N	0.015					< 0.002 mg/L N
PtChev4_WW_1-D	< 1 mg/L CC	1	119 mg/L HCO	119					Yes	0.011 mg/L N	0.011					0.055 mg/L N
PtChev4_WW_1-E	< 1 mg/L CC	1	126 mg/L HCO	126					Yes	< 0.005 mg/L N	0.005					0.018 mg/L N
PtChev4_WW_1-F	< 1 mg/L CC	1	125 mg/L HCO	125					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
Meo_HB_WW_1-000	< 1 mg/L CC	1	74 mg/L HCO3	74	< 2.0 mg/L O	2	165 mg/L O	165	Yes	0.082 mg/L N	0.082					2.060 mg/L N
Meo_HB_WW_1-030	< 1 mg/L CC	1	63 mg/L HCO3	63	< 2.0 mg/L O	2	124 mg/L O	124	Yes	0.082 mg/L N	0.082					2.160 mg/L N
Meo_HB_WW_1-060	< 1 mg/L CC	1	59 mg/L HCO3	59	< 2.0 mg/L O	2	69 mg/L O	69	Yes	0.089 mg/L N	0.089					2.270 mg/L N
Meo_HB_WW_1-120	< 1 mg/L CC	1	44 mg/L HCO3	44	10.1 mg/L O	10.1	30 mg/L O	30	Yes	0.543 mg/L N	0.543					1.610 mg/L N
Meo_HB_WW_1-180	< 1 mg/L CC	1	37 mg/L HCO3	37	22.0 mg/L O	22	85 mg/L O	85	Yes	0.728 mg/L N	0.728443					0.606 mg/L N
Meo_HB_WW_1-240	< 1 mg/L CC	1	30 mg/L HCO3	30	12.0 mg/L O	12	96 mg/L O	96	Yes	1.270 mg/L N	1.27					0.750 mg/L N
PtChev1_WW_1-A	< 1 mg/L CC	1	129 mg/L HCO	129					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
PtChev1_WW_1-B	< 1 mg/L CC	1	129 mg/L HCO	129					Yes	0.200 mg/L N	0.2					0.060 mg/L N
PtChev1_WW_1-C	< 1 mg/L CC	1	106 mg/L HCO	106					Yes	< 0.005 mg/L N	0.005					0.117 mg/L N
PtChev1_WW_1-D	< 1 mg/L CC	1	114 mg/L HCO	114					Yes	0.006 mg/L N	0.006					0.014 mg/L N
PtChev1_WW_1-E	< 1 mg/L CC	1	124 mg/L HCO	124					Yes	0.020 mg/L N	0.02					0.030 mg/L N
PtChev1_WW_1-F	< 1 mg/L CC	1	114 mg/L HCO	114					Yes	0.014 mg/L N	0.014					0.033 mg/L N
MEO_DS_WW_1_000	< 1 mg/L CC	1	48 mg/L HCO3	48	2.2 mg/L O	2.2	43 mg/L O	43	Yes	0.08 mg/L N	0.08					
MEO_DS_WW_1_030	< 1 mg/L CC	1	48 mg/L HCO3	48	2.2 mg/L O	2.2	52 mg/L O	52	Yes	0.088 mg/L N	0.088					
MEO_DS_WW_1_060	< 1 mg/L CC	1	39 mg/L HCO3	39	4.0 mg/L O	4	60 mg/L O	60	Yes	0.124 mg/L N	0.124					
MEO_DS_WW_1_120	< 1 mg/L CC	1	38 mg/L HCO3	38	11.0 mg/L O	11	78 mg/L O	78	Yes	1.4 mg/L N	1.4					
MEO_DS_WW_1_180	< 1 mg/L CC	1	38 mg/L HCO3	38	12.0 mg/L O	12	71 mg/L O	71	Yes	1.3 mg/L N	1.3					
MEO_DS_WW_1_240	< 1 mg/L CC	1	21 mg/L HCO3	21	18.0 mg/L O	18	82 mg/L O	82	Yes	0.62 mg/L N	0.62					
Meo_US_WW_1-000	< 1 mg/L CC	1	13 mg/L HCO3	13	10.0 mg/L O	10	192 mg/L O	192	Yes	0.409 mg/L N	0.409					
Meo_US_WW_1-030	< 1 mg/L CC	1	28 mg/L HCO3	28	3.4 mg/L O	3.4	103 mg/L O	103	Yes	0.14 mg/L N	0.14					
Meo_US_WW_1-060	< 1 mg/L CC	1	23 mg/L HCO3	23	3.3 mg/L O	3.3	67 mg/L O	67	Yes	0.092 mg/L N	0.092					
Meo_US_WW_1-120	< 1 mg/L CC	1	36 mg/L HCO3	36	3.2 mg/L O	3.2	102 mg/L O	102	Yes	0.056 mg/L N	0.056					
Meo_US_WW_1-180	< 1 mg/L CC	1	18 mg/L HCO3	18	< 2.0 mg/L O	2	97 mg/L O	97	Yes	0.065 mg/L N	0.065					
Meo_US_WW_1-240	< 1 mg/L CC	1	32 mg/L HCO3	32	< 2.0 mg/L O	2	77 mg/L O	77	Yes	0.128 mg/L N	0.128					
MEO_SW_WW_2_000	< 1 mg/L CC	1	45 mg/L HCO3	45	25.0 mg/L O	25	126 mg/L O	126	Yes	0.331 mg/L N	0.331					
MEO_SW_WW_2_010	< 1 mg/L CC	1	48 mg/L HCO3	48	14.0 mg/L O	14	104 mg/L O	104	Yes	0.271 mg/L N	0.271					
MEO_SW_WW_2_020	< 1 mg/L CC	1	31 mg/L HCO3	31	13.0 mg/L O	13	57 mg/L O	57	Yes	0.246 mg/L N	0.246					
MEO_SW_WW_2_030	< 1 mg/L CC	1	27 mg/L HCO3	27	8.4 mg/L O	8.4	40 mg/L O	40	Yes	0.152 mg/L N	0.152					
MEO_SW_WW_2_060	< 1 mg/L CC	1	30 mg/L HCO3	30	6.8 mg/L O	6.8	< 30 mg/L O	30	Yes	0.194 mg/L N	0.194					
MEO_SW_WW_2_120	< 1 mg/L CC	1	12 mg/L HCO3	12	5.6 mg/L O	5.6	40 mg/L O	40	Yes	0.117 mg/L N	0.117					
MEO_CSO_WW_2_000	< 1 mg/L CC	1	89 mg/L HCO3	89	170.0 mg/L O	170	370 mg/L O	370	Yes	9.9 mg/L N	9.9					
MEO_CSO_WW_2_010	< 1 mg/L CC	1	101 mg/L HCO	101	150.0 mg/L O	150	328 mg/L O	328	Yes	9.7 mg/L N	9.7					
MEO_CSO_WW_2_020	< 1 mg/L CC	1	76 mg/L HCO3	76	100.0 mg/L O	100	242 mg/L O	242	Yes	7.3 mg/L N	7.3					
MEO_CSO_WW_2_030	< 1 mg/L CC	1	80 mg/L HCO3	80	100.0 mg/L O	100	215 mg/L O	215	Yes	7.5 mg/L N	7.5					
MEO_CSO_WW_2_060	< 1 mg/L CC	1	81 mg/L HCO3	81	62.0 mg/L O	62	128 mg/L O	128	Yes	5.5 mg/L N	5.5					
Meo_US_WW_2-000	< 1 mg/L CC	1	19 mg/L HCO3	19	34.0 mg/L O	34	51 mg/L O	51	Yes	0.34 mg/L N	0.34					
Meo_US_WW_2-030	< 1 mg/L CC	1	18 mg/L HCO3	18	5.9 mg/L O	5.9	19.8 mg/L O	19.8	Yes	0.225 mg/L N	0.225					
Meo_US_WW_2-060	< 1 mg/L CC	1	27 mg/L HCO3	27	8.4 mg/L O	8.4	33 mg/L O	33	Yes	0.537 mg/L N	0.537					
Meo_US_WW_2-120	< 1 mg/L CC	1	19 mg/L HCO3	19	6.8 mg/L O	6.8	36 mg/L O	36	Yes	0.23 mg/L N	0.23					
Meo_US_WW_2-180	< 1 mg/L CC	1	18 mg/L HCO3	18	8.0 mg/L O	8	59 mg/L O	59	Yes	0.098 mg/L N	0.098					
Meo_US_WW_2-240	< 1 mg/L CC	1	24 mg/L HCO3	24	6.9 mg/L O	6.9	14.9 mg/L O	14.9	Yes	0.114 mg/L N	0.114					
Meo_HB_WW_2-000	< 1 mg/L CC	1	81 mg/L HCO3	81	< 2.0 mg/L O	2	315 mg/L O	315	Yes	0.211 mg/L N	0.211					2.230 mg/L N
Meo_HB_WW_2-030	< 1 mg/L CC	1	74 mg/L HCO3	74	2.6 mg/L O	2.6	168 mg/L O	168	Yes	0.274 mg/L N	0.274					2.060 mg/L N
Meo_HB_WW_2-060	< 1 mg/L CC	1	71 mg/L HCO3	71	2.4 mg/L O	2.4	168 mg/L O	168	Yes	0.316 mg/L N	0.316					2.170 mg/L N
Meo_HB_WW_2-120	< 1 mg/L CC	1	66 mg/L HCO3	66	< 2.0 mg/L O	2	87 mg/L O	87	Yes	0.168 mg/L N	0.168					3.260 mg/L N
Meo_HB_WW_2-180	< 1 mg/L CC	1	29 mg/L HCO3	29	8.5 mg/L O	8.5	56 mg/L O	56	Yes	0.265 mg/L N	0.265					1.010 mg/L N
Meo_HB_WW_2-240	< 1 mg/L CC	1	44 mg/L HCO3	44	28.0 mg/L O	28	100 mg/L O	100	Yes	2.090 mg/L N	2.09					0.862 mg/L N
MEO_DS_WW_2_000	< 1 mg/L CC	1	59 mg/L HCO3	59	< 2.0 mg/L O	2	1.7 mg/L O	1.7	Yes	0.03 mg/L N	0.03					
MEO_DS_WW_2_030	< 1 mg/L CC	1	56 mg/L HCO3	56	< 2.0 mg/L O	2	3.3 mg/L O	3.3	Yes	0.042 mg/L N	0.042					
MEO_DS_WW_2_060	< 1 mg/L CC	1	52 mg/L HCO3	52	< 2.0 mg/L O	2	4.1 mg/L O	4.1	Yes	0.097 mg/L N	0.097					
MEO_DS_WW_2_120	< 1 mg/L CC	1	39 mg/L HCO3	39	13.0 mg/L O	13	23.9 mg/L O	23.9	Yes	1.381 mg/L N	1.381					
MEO_DS_WW_2_180	< 1 mg/L CC	1	43 mg/L HCO3	43	14.0 mg/L O	14	32 mg/L O	32	Yes	2.189 mg/L N	2.189					
MEO_DS_WW_2_240	< 1 mg/L CC	1	26 mg/L HCO3	26	28.0 mg/L O	28	160 mg/L O	160	Yes	1.112 mg/L N	1.112					
PtChev1_WW_2-A	< 1 mg/L CC	1	129 mg/L HCO	129					Yes	0.006 mg/L N	0.006					0.002 mg/L N
PtChev1_WW_2-B	< 1 mg/L CC	1	138 mg/L HCO	138					Yes	< 0.005 mg/L N	0.005					0.004 mg/L N
PtChev1_WW_2-C	< 1 mg/L CC	1	129 mg/L HCO	129					Yes	0.013 mg/L N	0.013					0.098 mg/L N
PtChev1_WW_2-D	16 mg/L CO	16	93 mg/L HCO3	93					Yes	0.013 mg/L N	0.013					0.078 mg/L N
PtChev1_WW_2-E	< 1 mg/L CC	1	129 mg/L HCO	129					Yes	0.019 mg/L N	0.019					0.067 mg/L N
PtChev1_WW_2-F	17 mg/L CO	17	99 mg/L HCO3	99					Yes	0.007 mg/L N	0.007					0.024 mg/L N
PtChev2_WW_2-A	< 1 mg/L CC	1	128 mg/L HCO	128					Yes	0.019 mg/L N	0.019					0.007 mg/L N
PtChev2_WW_2-B	< 1 mg/L CC	1	138 mg/L HCO	138					Yes	0.009 mg/L N	0.009					0.003 mg/L N
PtChev2_WW_2-C	< 1 mg/L CC	1	140 mg/L HCO	140					Yes	< 0.005 mg/L N	0.005					0.005 mg/L N
PtChev2_WW_2-D	< 1 mg/L CC	1	131 mg/L HCO	131					Yes	0.012 mg/L N	0.012					0.160 mg/L N
PtChev2_WW_2-E	< 1 mg/L CC	1	145 mg/L HCO	145					Yes	< 0.005 mg/L N	0.005					0.018 mg/L N
PtChev2_WW_2-F	< 1 mg/L CC	1	133 mg/L HCO	133					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
PtChev3_WW_2-A	< 1 mg/L CC	1	137 mg/L HCO	137					Yes	0.040 mg/L N	0.04					0.344 mg/L N
PtChev3_WW_2-B	17 mg/L CO	17	103 mg/L HCO	103					Yes	< 0.005 mg/L N	0.005					0.007 mg/L N
PtChev3_WW_2-C	< 1 mg/L CC	1	134 mg/L HCO	134					Yes	< 0.005 mg/L N	0.005					0.003 mg/L N
PtChev3_WW_2-D	18 mg/L CO	18	98 mg/L HCO3	98					Yes	< 0.005 mg/L N	0.005					0.007 mg/L N
PtChev3_WW_2-E	< 1 mg/L CC	1	127 mg/L HCO	127					Yes	0.007 mg/L N	0.007					0.110 mg/L N
PtChev3_WW_2-F	18 mg/L CO	18	102 mg/L HCO	102					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N
PtChev4_WW_2-A	< 1 mg/L CC	1	125 mg/L HCO	125					Yes	0.059 mg/L N	0.059					0.543 mg/L N
PtChev4_WW_2-B	< 1 mg/L CC	1	128 mg/L HCO	128					Yes	0.021 mg/L N	0.021					0.131 mg/L N
PtChev4_WW_2-C	< 1 mg/L CC	1	130 mg/L HCO	130					Yes	0.006 mg/L N	0.006					0.008 mg/L N
PtChev4_WW_2-D	< 1 mg/L CC	1	130 mg/L HCO	130					Yes	0.008 mg/L N	0.008					0.058 mg/L N
PtChev4_WW_2-E	< 1 mg/L CC	1	132 mg/L HCO	132					Yes	< 0.005 mg/L N	0.005					0.031 mg/L N
PtChev4_WW_2-F	< 1 mg/L CC	1	139 mg/L HCO	139					Yes	< 0.005 mg/L N	0.005					< 0.002 mg/L N

Sample Name	Decimal Result * refer note Nitrate & Nitrite Nitrogen by Cd Reduction/SFA mg/L N	Test Result Total Nitrogen	Decimal Result * refer note Total Nitrogen mg/L N	Test Result Salinity	Decimal Result * refer note Salinity ppt	Test Result Soluble Reactive Phosphorus	Decimal Result * refer note Soluble Reactive Phosphorus mg/L P	Test Result pH at room temp (c.20°C)	Decimal Result * refer note pH at room temp (c.20°C) pH Unit	Test Result Suspended solids	Decimal Result * refer note Suspended solids	Test Result Total Kjeldahl Nitrogen	Decimal Result * refer note Total Kjeldahl Nitrogen mg/L N	Test Result Turbidity by Hach Meter	Decimal Result * refer note Turbidity by Hach Meter NTU	Test Result Arsenic: Soluble by ICPMS-Trace
MEO_DS_Base_20101129						0.057 mg/L P	0.057	7.4 pH Unit	7.36	5. mg/L	5	0.34 mg/L N	0.34	2.49 NTU (0 -	2.49	0.00039 mg/L
MEO_HB_Base_20101129	2.95	3.58 mg/L N	3.58	3.7 ppt	3.7	0.032 mg/L P	0.032	7.3 pH Unit	7.32	12. mg/L	12	0.63 mg/L N	0.63			< 0.001 mg/L
MEO_MID_Base_20101129						0.119 mg/L P	0.119	7.9 pH Unit	7.9	3.3 mg/L	3.3	0.39 mg/L N	0.39	7.17 NTU (0 -	7.17	0.0009 mg/L
MEO_US_Base_20101129						0.084 mg/L P	0.084	7.5 pH Unit	7.5	18. mg/L	18	0.38 mg/L N	0.38	4.83 NTU (0 -	4.83	0.00043 mg/L
PtChev_1_Base_20101129	0.002	0.04 mg/L N	0.04	35. ppt	35	0.017 mg/L P	0.017	8.0 pH Unit	8.01	17. mg/L	17	0.038 mg/L N	0.038			0.0016 mg/L
PtChev_2_Base_20101129	0.009	0.04 mg/L N	0.04	35. ppt	35	0.015 mg/L P	0.015	8.0 pH Unit	8.02	17. mg/L	17	0.031 mg/L N	0.031			0.0016 mg/L
PtChev_3_Base_20101129	0.01	0.04 mg/L N	0.04	35. ppt	35	0.015 mg/L P	0.015	8.0 pH Unit	8.03	14. mg/L	14	0.03 mg/L N	0.03			0.0015 mg/L
PtChev_4_Base_20101129	0.002	0.03 mg/L N	0.03	35.3 ppt	35.3	0.017 mg/L P	0.017	8.0 pH Unit	8.03	14. mg/L	14	0.028 mg/L N	0.028			0.0016 mg/L
MEO_DS_Base_20101201																
Meo_SS 2010121						0.036 mg/L P	0.036	7.5 pH Unit	7.46	14. mg/L	14	1.02 mg/L N	1.02	12.9 NTU (0 -	12.9	0.00039 mg/L
PtChev_4_Base_20101224	0.003	< 0.02 mg/L N	0.02	33.1 ppt	33.1	0.027 mg/L P	0.027	8.1 pH Unit	8.08	6. mg/L	6	0.017 mg/L N	0.017	2.78 NTU (0 -	2.78	0.0016 mg/L
PtChev_3_Base_20101224	0.003	< 0.02 mg/L N	0.02	32.9 ppt	32.9	0.014 mg/L P	0.014	8.1 pH Unit	8.08	6.4 mg/L	6.4	0.017 mg/L N	0.017	2.71 NTU (0 -	2.71	0.0015 mg/L
MEO_HB_Base_20101224	0.133	0.25 mg/L N	0.25	31.2 ppt	31.2	0.026 mg/L P	0.026	7.9 pH Unit	7.92	23. mg/L	23	0.117 mg/L N	0.117	12.1 NTU (0 -	12.1	0.0016 mg/L
MEO_MID_Base_20101224						0.054 mg/L P	0.054	7.8 pH Unit	7.76	2.4 mg/L	2.4	0.22 mg/L N	0.22	2.42 NTU (0 -	2.42	0.00045 mg/L
MEO_DS_Base_20101224						0.066 mg/L P	0.066	7.3 pH Unit	7.26	2. mg/L	2	0.28 mg/L N	0.28	1.52 NTU (0 -	1.52	0.00044 mg/L
MEO_US_Base_20101224						0.031 mg/L P	0.031	7.6 pH Unit	7.57	4.4 mg/L	4.4	0.44 mg/L N	0.44	2.4 NTU (0 -	2.4	0.0012 mg/L
PtChev_1_Base_20101224	0.006	< 0.02 mg/L N	0.02	32.8 ppt	32.8	0.012 mg/L P	0.012	8.1 pH Unit	8.05	6.6 mg/L	6.6	0.014 mg/L N	0.014	2.02 NTU (0 -	2.02	0.0015 mg/L
PtChev_2_Base_20101224	0.002	< 0.02 mg/L N	0.02	32.8 ppt	32.8	0.013 mg/L P	0.013	8.1 pH Unit	8.08	6.8 mg/L	6.8	0.018 mg/L N	0.018	2.31 NTU (0 -	2.31	0.0018 mg/L
Meo_OF_Base_20101224						5.462 mg/L P	5.462	7.8 pH Unit	7.76	163 mg/L	163	53.97 mg/L N	53.97	67.9 NTU (0 -	67.9	0.0014 mg/L
PtChev_1_Base_20110127	0.003	0.04 mg/L N	0.04	32.3 ppt	32.3	0.015 mg/L P	0.015	8.1 pH Unit	8.11	11. mg/L	11	0.037 mg/L N	0.037	2.51 NTU (0 -	2.51	0.0018 mg/L
PtChev_2_Base_20110127	0.002	0.05 mg/L N	0.05	32.2 ppt	32.2	0.016 mg/L P	0.016	8.1 pH Unit	8.14	14. mg/L	14	0.048 mg/L N	0.048	2.56 NTU (0 -	2.56	0.0017 mg/L
PtChev_3_Base_20110127	0.002	0.03 mg/L N	0.03	32.4 ppt	32.4	0.017 mg/L P	0.017	8.1 pH Unit	8.13	5.7 mg/L	5.7	0.028 mg/L N	0.028	2.29 NTU (0 -	2.29	0.0015 mg/L
PtChev_4_Base_20110127	0.002	0.08 mg/L N	0.08	32.6 ppt	32.6	0.02 mg/L P	0.02	8.1 pH Unit	8.13	9.2 mg/L	9.2	0.078 mg/L N	0.078	2.17 NTU (0 -	2.17	0.0017 mg/L
MEO_MID_Base_20110127						0.068 mg/L P	0.068	7.4 pH Unit	7.44	2.3 mg/L	2.3	0.66 mg/L N	0.66	1.37 NTU (0 -	1.37	0.00046 mg/L
MEO_US_Base_20110127						0.064 mg/L P	0.064	7.4 pH Unit	7.42	3. mg/L	3	0.72 mg/L N	0.72	3.43 NTU (0 -	3.43	0.00097 mg/L
MEO_HB_Base_20110127	3.21	5.2 mg/L N	5.2	0.8 ppt	0.8	0.052 mg/L P	0.052	7.5 pH Unit	7.45	7.6 mg/L	7.6	1.99 mg/L N	1.99	4.88 NTU (0 -	4.88	< 0.001 mg/L
MEO_DS_Base_20110127						0.054 mg/L P	0.054	7.6 pH Unit	7.63	1.3 mg/L	1.3	0.40 mg/L N	0.4	1.29 NTU (0 -	1.29	0.00036 mg/L
Meo_OF_Base_20110127						2.197 mg/L P	2.197	7.6 pH Unit	7.59	68 mg/L	36	29.77 mg/L N	29.77	45.8 NTU (0 -	45.8	0.0011 mg/L
Meo_OF_RCT_Base_20110127						0.039 mg/L P	0.039	7.3 pH Unit	7.26	340. mg/L	340	3.46 mg/L N	3.46	228. NTU (0 -	228	0.00049 mg/L
MEO_SW_WW_1_000						0.022 mg/L P	0.022	7.2 pH Unit	7.2	37 mg/L	36.8	0.74 mg/L N	0.74	16.6 NTU (0 -	16.6	0.015 mg/L
MEO_SW_WW_1_010						0.028 mg/L P	0.028	7.3 pH Unit	7.28	36 mg/L	35.6	0.80 mg/L N	0.8	14.3 NTU (0 -	14.3	0.015 mg/L
MEO_SW_WW_1_020						0.032 mg/L P	0.032	7.3 pH Unit	7.29	26 mg/L	26	0.66 mg/L N	0.66	15.2 NTU (0 -	15.2	0.014 mg/L
MEO_SW_WW_1_030						0.025 mg/L P	0.025	7.3 pH Unit	7.25	26 mg/L	26.2	1.09 mg/L N	1.09	13.2 NTU (0 -	13.2	0.016 mg/L
MEO_SW_WW_1_060						0.026 mg/L P	0.026	7.3 pH Unit	7.32	20 mg/L	20.4	0.47 mg/L N	0.47	9.32 NTU (0 -	9.32	0.013 mg/L
MEO_SW_WW_1_120						0.028 mg/L P	0.028	7.4 pH Unit	7.37	12 mg/L	12	0.36 mg/L N	0.36	7.1 NTU (0 -	7.1	0.017 mg/L
MEO_CSO_WW_1_000						0.416 mg/L P	0.416	6.8 pH Unit	6.82	121 mg/L	121.3333333	8.10 mg/L N	8.1	44.5 NTU (0 -	44.5	0.00096 mg/L
MEO_CSO_WW_1_010						0.374 mg/L P	0.374	6.8 pH Unit	6.79	98 mg/L	98	8.11 mg/L N	8.11	41. NTU (0 -	41	0.0009 mg/L
MEO_CSO_WW_1_020						0.302 mg/L P	0.302	6.8 pH Unit	6.8	84 mg/L	84.33333333	7.12 mg/L N	7.12	32. NTU (0 -	32	0.00097 mg/L
MEO_CSO_WW_1_030						0.303 mg/L P	0.303	6.8 pH Unit	6.81	67 mg/L	67	6.68 mg/L N	6.68	31. NTU (0 -	31	0.00092 mg/L
MEO_CSO_WW_1_060						0.298 mg/L P	0.298	6.9 pH Unit	6.86	57 mg/L	57.33333333	5.84 mg/L N	5.84	24.4 NTU (0 -	24.4	0.00098 mg/L
MEO_CSO_WW_1_120						0.234 mg/L P	0.234	6.7 pH Unit	6.67	52 mg/L	52.33333333	6.07 mg/L N	6.07	23.3 NTU (0 -	23.3	0.00098 mg/L
PtChev2_WW_1-A	0.002	< 0.04 mg/L N	0.04	31. ppt	31	0.014 mg/L P	0.014	8.2 pH Unit	8.17	35 mg/L	35	0.038 mg/L N	0.038	3.44 NTU (0 -	3.44	0.0016 mg/L
PtChev2_WW_1-B	0.045	< 0.04 mg/L N	0.04	29.8 ppt	29.8	0.028 mg/L P	0.028	8.1 pH Unit	8.13	91 mg/L	90.6	mg/L N	-0.005	18.6 NTU (0 -	18.6	0.0017 mg/L
PtChev2_WW_1-C	0.035	< 0.04 mg/L N	0.04	30.6 ppt	30.6	0.016 mg/L P	0.016	8.1 pH Unit	8.13	43 mg/L	43	0.005 mg/L N	0.005	7.94 NTU (0 -	7.94	0.0017 mg/L
PtChev2_WW_1-D	0.022	< 0.04 mg/L N	0.04	30.1 ppt	30.1	0.018 mg/L P	0.018	8.1 pH Unit	8.14	50 mg/L	49.6	0.018 mg/L N	0.018	8.51 NTU (0 -	8.51	0.0017 mg/L
PtChev2_WW_1-E	0.028	< 0.04 mg/L N	0.04	28.8 ppt	28.8	0.016 mg/L P	0.016	8.2 pH Unit	8.15	49 mg/L	49.2	0.012 mg/L N	0.012	9.06 NTU (0 -	9.06	0.0016 mg/L
PtChev2_WW_1-F	0.029	< 0.04 mg/L N	0.04	30.3 ppt	30.3	0.015 mg/L P	0.015	8.1 pH Unit	8.12	41 mg/L	40.6	0.011 mg/L N	0.011	6.54 NTU (0 -	6.54	0.0019 mg/L
PtChev3_WW_1-A	0.002	< 0.04 mg/L N	0.04	29. ppt	29	0.014 mg/L P	0.014	8.2 pH Unit	8.16	47 mg/L	47	0.038 mg/L N	0.038	11. NTU (0 -	11	0.0016 mg/L
PtChev3_WW_1-B	0.002	< 0.04 mg/L N	0.04	29.3 ppt	29.3	0.014 mg/L P	0.014	8.2 pH Unit	8.15	38 mg/L	37.6	0.038 mg/L N	0.038	4.77 NTU (0 -	4.77	0.0018 mg/L
PtChev3_WW_1-C	0.002	< 0.04 mg/L N	0.04	29.1 ppt	29.1	0.015 mg/L P	0.015	8.1 pH Unit	8.12	42 mg/L	42.2	0.038 mg/L N	0.038	8.16 NTU (0 -	8.16	0.0017 mg/L
PtChev3_WW_1-D	0.048	< 0.04 mg/L N	0.04	28.5 ppt	28.5	0.018 mg/L P	0.018	8.1 pH Unit	8.06	56 mg/L	55.8	mg/L N	-0.008	12.6 NTU (0 -	12.6	0.0019 mg/L
PtChev3_WW_1-E	0.019	< 0.04 mg/L N	0.04	30.1 ppt	30.1	0.016 mg/L P	0.016	8.1 pH Unit	8.06	36 mg/L	36.4	0.021 mg/L N	0.021	5.11 NTU (0 -	5.11	0.0017 mg/L
PtChev3_WW_1-F	0.013	< 0.04 mg/L N	0.04	28.8 ppt	28.8	0.015 mg/L P	0.015	8.2 pH Unit	8.15	40 mg/L	39.6	0.027 mg/L N	0.027	4.98 NTU (0 -	4.98	0.0016 mg/L
PtChev4_WW_1-A	0.002	< 0.04 mg/L N	0.04	31.5 ppt	31.5	0.027 mg/L P	0.027	8.1 pH Unit	8.14	49 mg/L	49.2	0.038 mg/L N	0.038	4.78 NTU (0 -	4.78	0.0017 mg/L
PtChev4_WW_1-B	0.002	< 0.04 mg/L N	0.04	30.2 ppt	30.2	0.025 mg/L P	0.025	8.2 pH Unit	8.15	86 mg/L	85.8	0.038 mg/L N	0.038	13.7 NTU (0 -	13.7	0.0018 mg/L
PtChev4_WW_1-C	0.002	< 0.04 mg/L N	0.04	29.8 ppt	29.8	0.014 mg/L P	0.014	8.1 pH Unit	8.14	51 mg/L	51.4	0.038 mg/L N	0.038	6.57 NTU (0 -	6.57	0.0018 mg/L
PtChev4_WW_1-D	0.055	0.14 mg/L N	0.14	28.1 ppt	28.1	0.015 mg/L P	0.015	8.1 pH Unit	8.1	50 mg/L	49.6	0.085 mg/L N	0.085	11.1 NTU (0 -	11.1	0.0017 mg/L
PtChev4_WW_1-E	0.018	< 0.04 mg/L N	0.04	29.9 ppt	29.9	0.016 mg/L P	0.016	8.1 pH Unit	8.12	49 mg/L	48.6	0.022 mg/L N	0.022	5.53 NTU (0 -	5.53	0.0018 mg/L
PtChev4_WW_1-F	0.002	< 0.04 mg/L N	0.04	27.3 ppt	27.3	0.014 mg/L P	0.014	8.2 pH Unit	8.16	41 mg/L	41.2	0.038 mg/L N	0.038	4.36 NTU (0 -	4.36	0.0018 mg/L
Meo_HB_WW_1-000	2.06	2.8 mg/L N	2.8	7.8 ppt	7.8	0.045 mg/L P	0.045	7.4 pH Unit	7.35	31 mg/L	30.8	0.74 mg/L N	0.74	12.7 NTU (0 -	12.7	< 0.001 mg/L
Meo_HB_WW_1-030	2.16	3.1 mg/L N	3.1	4.6 ppt	4.6	0.052 mg/L P	0.052	7.3 pH Unit	7.32	39 mg/L	39.2	0.94 mg/L N	0.94	16.4 NTU (0 -	16.4	< 0.001 mg/L
Meo_HB_WW_1-060	2.27	2.8 mg/L N	2.8	2.8 ppt	2.8	0.052 mg/L P	0.052	7.3 pH Unit	7.29	53 mg/L	53.2	0.53 mg/L N	0.53	21.1 NTU (0 -	21.1	< 0.001 mg/L
Meo_HB_WW_1-120	1.61	4.1 mg/L N	4.1	0.2 ppt	0.2	0.13 mg/L P	0.13	7.0 pH Unit	7.04	64 mg/L	64.2	2.49 mg/L N	2.49	28.2 NTU (0 -	28.2	< 0.001 mg/L
Meo_HB_WW_1-180	0.606	3. mg/L N	3	0.1 ppt	0.1	0.16 mg/L P	0.16	7.0 pH Unit	6.99	137 mg/L	137	2.394 mg/L N	2.394	53.5 NTU (0 -	53.5	0.0016 mg/L
Meo_HB_WW_1-240	0.75	3.5 mg/L N	3.5	0.2 ppt	0.2	0.13 mg/L P	0.13	6.9 pH Unit	6.88	92 mg/L	91.66666667	2.75 mg/L N	2.75	43.9 NTU (0 -	43.9	0.0018 mg/L
PtChev1_WW_1-A	0.002	< 0.04 mg/L N	0.04	30.9 ppt	30.9	0.013 mg/L P	0.013	8.1 pH Unit	8.1	48 mg/L	48.2	0.038 mg/L N	0.038	4.92 NTU (0 -	4.92	0.0017 mg/L
PtChev1_WW_1-B	0.06	0.23 mg/L N	0.23	29.6 ppt	29.6	0.014 mg/L P	0.014	8.1 pH Unit	8.11	147 mg/L	146.6	0.17 mg/L N	0.17	34.3 NTU (0 -	34.3	0.0018 mg/L
PtChev1_WW_1-C	0.117	0.27 mg/L N	0.27	27.7 ppt	27.7	0.019 mg/L P	0.019	8.1 pH Unit	8.09	161 mg/L	160.6	0.153 mg/L N	0.153	36.5 NTU (0 -	36.5	0.0018 mg/L
PtChev1_WW_1-D	0.014	< 0.04 mg/L N	0.04	30.4 ppt	30.4	0.015 mg/L P	0.015	8.1 pH Unit	8.13	63 mg/L	63.4	0.026 mg/L N	0.026	8.66 NTU (0 -	8.66	0.0018 mg/L
PtChev1_WW_1-E	0.03	< 0.04 mg/L N	0.04	30.2 ppt	30.2	0.017 mg/L P	0.017	8.1 pH Unit	8.13	53 mg/L	52.8	0.01 mg/L N	0.01	9.56 NTU (0 -	9.56	0.0017 mg/L
PtChev1_WW_1-F	0.033	< 0.04 mg/L N	0.04	29.7 ppt	29.7	0.017 mg/L P	0.017	8.1 pH Unit	8.14	39 mg/L	38.8	0.007 mg/L N	0.007	7.38 NTU (0 -	7.38	0.0018 mg/L
MEO_DS_WW_1_000						0.063 mg/L P	0.063	7.2 pH Unit	7.24	7 mg/L	6.6	0.45 mg/L N	0.45	3.93 NTU (0 -	3.93	0.00064 mg/L
MEO_DS_WW_1_030						0.069 mg/L P	0.069	7.2 pH Unit	7.19	9 mg/L	9.2	0.49 mg/L N	0.49	4.93 NTU (0 -	4.93	0.00067 mg/L
MEO_DS_WW_1_060						0.065 mg/L P	0.065	7.1 pH Unit	7.1	21 mg/L	21.2	0.78 mg/L N	0.78	11.2 NTU (0 -	11.2	0.0011 mg/L
MEO_DS_WW_1_120						0.13 mg/L P	0.13	7.0 pH Unit	6.99	31 mg/L	31.4	2.70 mg/L N	2.7	16.3 NTU (0 -	16.3	0.002 mg/L
MEO_DS_WW_1_180						0.165 mg/L P	0.165	7.0 pH Unit	7	26 mg/L	26.2	2.24 mg/L N	2.24	14.3 NTU (0 -	14.3	0.0017 mg/L
MEO_DS_WW_1_240						0.111 mg/L P	0.111	7.0 pH Unit	6.99	106 mg/L	105.6666667	2.37 mg/L N	2.37	39.3 NTU (0 -	39.3	0.0017 mg/L
Meo_US_WW_1-000						0.061 mg/L P	0.061	7.0 pH Unit	6.99	88 mg/L	88.33333333	5.36 mg/L N	5.36	27.1 NTU (0 -	27.1	0.0011 mg/L
Meo_US_WW_1-030						0.026 mg/L P	0.026	7.1 pH Unit	7.13	22 mg/L	22.33333333	1.45 mg/L N	1.45	13.8 NTU (0 -	13.8	0.001 mg/L
Meo_US_WW_1-060						0.026 mg/L P	0.026	7.2 pH Unit	7.17	21 mg/L	20.6	0.36 mg/L N	0.36	11.4 NTU (0 -	11.4	0.0012 mg/L
Meo_US_WW_1-120						0.027 mg/L P	0.027	7.2 pH Unit	7.19	17 mg/L	17.4	0.53 mg/L N	0.53	9.65 NTU (0 -	9.65	0.0016 mg/L
Meo_US_WW_1-180						0.018 mg/L P	0.018	7.2 pH Unit	7.21	23 mg/L	23	0.30 mg/L N	0.3	8.24 NTU (0 -	8.24	0.0015 mg/L
Meo_US_WW_1-240						0.017 mg/L P	0.017	7.2 pH Unit	7.24	24 mg/L	23.8	0.20 mg/L N	0.2	6.33 NTU (0 -	6.33	0.0025 mg/L
MEO_SW_WW_2_000						0.085 mg/L P	0.085	7.2 pH Unit	7.15	178 mg/L	177.5	2.34 mg/L N	2.34	121. NTU (0 -	121	0.0035 mg/L
MEO_SW_WW_2_010						0.077 mg/L P	0.077	7.2 pH Unit	7.17	105 mg/L	104.5	1.67 mg/L N	1.67	80.4 NTU (0 -	80.4	0.0045 mg/L
MEO_SW_WW_2_020						0.071 mg/L P	0.071	7.0 pH Unit	7	65 mg/L	64.66666667	1.14 mg/L N	1.14	37.5 NTU (0 -	37.5	0.0089 mg/L
MEO_SW_WW_2_030						0.061 mg/L P	0.061	7.1 pH Unit	7.09	34 mg/L	33.8	0.72 mg/L N	0.72	18.6 NTU (0 -	18.6	0.0065 mg/L
MEO_SW_WW_2_060						0.076 mg/L P	0.076	7.3 pH Unit	7.25	24 mg/L	24	0.74 mg/L N	0.74	13.5 NTU (0 -	13.5	0.0075 mg/L
MEO_SW_WW_2_120						0.046 mg/L P	0.046	7.2 pH Unit	7.21	46 mg/L	45.8	0.74 mg/L N	0.74	18. NTU (0 -	18	0.0055 mg/L
MEO_CSO_WW_2_000						1.706 mg/L P	1.706	7.0 pH Unit	6.99	377 mg/L	377	24.99 mg/L N	24.99	159. NTU (0 -	159	0.0016 mg/L
MEO_CSO_WW_2_010						1.737 mg/L P	1.737	7.0 pH Unit	6.99	256 mg/L	255.5	23.81 mg/L N	23.81	112. NTU (0 -	112	0.00088 mg/L
MEO_CSO_WW_2_020						1.238 mg/L P	1.238	7.0 pH Unit	6.98	200 mg/L	199.5	16.74 mg/L N	16.74	107. NTU (0 -	107	0.0008 mg/L
MEO_CSO_WW_2_030						1.426 mg/L P	1.426	7.0 pH Unit	7.03	181 mg/L	181	18.27 mg/L N	18.27	80.4 NTU (0 -	80.4	0.00071 mg/L
MEO_CSO_WW_2_060						1.017 mg/L P	1.017	7.0 pH Unit	7.02	86 mg/L	85.66666667	12.11 mg/L N	12.11	44. NTU (0 -	44	0.0007 mg/L
Meo_US_WW_2-000						0.079 mg/L P	0.079	7.0 pH Unit	6.99	36 mg/L	36.2	1.17 mg/L N	1.17	17.1 NTU (0 -	17.1	0.00087 mg/L
Meo_US_WW_2-030						0.046 mg/L P	0.046	7.1 pH Unit	7.11	18 mg/L	17.8	0.87 mg/L N	0.87	12.4 NTU (0 -	12.4	0.0011 mg/L
Meo_US_WW_2-060						0.078 mg/L P	0.078	7.2 pH Unit	7.22	18 mg/L	18.4	1.71 mg/L N	1.71	9.61 NTU (0 -	9.61	0.0016 mg/L
Meo_US_WW_2-120						0.048 mg/L P	0.048	7.1 pH Unit	7.07	21 mg/L	20.6	0.49 mg/L N	0.49	17.7 NTU (0 -	17.7	0.00093 mg/L
Meo_US_WW_2-180						0.021 mg/L P	0.021	7.2 pH Unit	7.24	50 mg/L	50.4	0.87 mg/L N	0.87	16.3 NTU (0 -	16.3	0.0021 mg/L
Meo_US_WW_2-240						0.026 mg/L P	0.026	7.3 pH Unit	7.31	28 mg/L	28	0.78 mg/L N	0.78	17.2 NTU (0 -	17.2	0.0021 mg/L
Meo_HB_WW_2-000	2.23	2.5 mg/L N	2.5	10.6 ppt	10.6	0.043 mg/L P	0.043	7.5 pH Unit	7.46	66 mg/L	65.8	0.27 mg/L N	0.27	26.4 NTU (0 -	26.4	< 0.001 mg/L
Meo_HB_WW_2-030	2.06	2.5 mg/L N	2.5	7.6 ppt	7.6	0.047 mg/L P	0.047	7.4 pH Unit	7.41	68 mg/L	68	0.44 mg/L N	0.44	33.4 NTU (0 -	33.4	< 0.001 mg/L
Meo_HB_WW_2-060	2.17	2.6 mg/L N	2.6	6.3 ppt	6.3	0.054 mg/L P	0.054	7.5 pH Unit	7.48	60 mg/L	60.4	0.43 mg/L N	0.43	24.3 NTU (0 -	24.3	< 0.001 mg/L
Meo_HB_WW_2-120	3.26	4.4 mg/L N	4.4	2.3 ppt	2.3	0.046 mg/L P	0.046	7.5 pH Unit	7.5	61 mg/L	60.8	1.14 mg/L N	1.14	25. NTU (0 -	25	< 0.001 mg/L
Meo_HB_WW_2-180	1.01	3.8 mg/L N	3.8	0.5 ppt	0.5	0.068 mg/L P	0.068	7.2 pH Unit	7.18	215 mg/L	214.6666667	2.79 mg/L N	2.79	97.2 NTU (0 -	97.2	< 0.001 mg/L
Meo_HB_WW_2-240	0.862	6.9 mg/L N	6.9	0.1 ppt	0.1	0.327 mg/L P	0.327	7.0 pH Unit	6.97	281 mg/L	281	6.038 mg/L N	6.038	117. NTU (0 -	117	0.001 mg/L
MEO_DS_WW_2_000						0.06 mg/L P	0.06	7.3 pH Unit	7.32	2 mg/L	2	< 0.10 mg/L N	0.1	1.52 NTU (0 -	1.52	0.00034 mg/L
MEO_DS_WW_2_030						0.064 mg/L P	0.064	7.4 pH Unit	7.4	4 mg/L	3.666666667	0.14 mg/L N	0.14	2.3 NTU (0 -	2.3	0.00036 mg/L
MEO_DS_WW_2_060						0.073 mg/L P	0.073	7.4 pH Unit	7.37	8 mg/L	7.833333333	0.37 mg/L N	0.37	3.33 NTU (0 -	3.33	0.00042 mg/L
MEO_DS_WW_2_120						0.205 mg/L P	0.205	7.1 pH Unit	7.11	26 mg/L	26.33333333	2.36 mg/L N	2.36	18.8 NTU (0 -	18.8	0.0011 mg/L
MEO_DS_WW_2_180						0.249 mg/L P	0.249	7.2 pH Unit	7.15	35 mg/L	35.33333333	3.51 mg/L N	3.51	24.3 NTU (0 -	24.3	0.0012 mg/L
MEO_DS_WW_2_240						0.182 mg/L P	0.182	6.8 pH Unit	6.8	201 mg/L	200.5	4.31 mg/L N	4.31	95.2 NTU (0 -	95.2	0.0013 mg/L
PtChev1_WW_2-A	0.002	0.11 mg/L N	0.11	30.2 ppt	30.2	0.018 mg/L P	0.018	8.1 pH Unit	8.09	117 mg/L	116.6	0.108 mg/L N	0.108	28.9 NTU (0 -	28.9	0.0015 mg/L
PtChev1_WW_2-B	0.004	0.02 mg/L N	0.02	30.1 ppt	30.1	0.019 mg/L P	0.019	8.1 pH Unit	8.12	124 mg/L	123.6	0.016 mg/L N	0.016	11.6 NTU (0 -	11.6	0.0014 mg/L
PtChev1_WW_2-C	0.098	0.2 mg/L N	0.2	28.5 ppt	28.5	0.021 mg/L P	0.021	8.1 pH Unit	8.11	79 mg/L	78.6	0.102 mg/L N	0.102	11.6 NTU (0 -	11.6	0.0015 mg/L
PtChev1_WW_2-D	0.078	0.16 mg/L N	0.16	29.1 ppt	29.1	0.018 mg/L P	0.018	8.1 pH Unit	8.1	67 mg/L	67	0.082 mg/L N	0.082	9.27 NTU (0 -	9.27	0.0018 mg/L
PtChev1_WW_2-E	0.067	0.11 mg/L N	0.11	29.2 ppt	29.2	0.019 mg/L P	0.019	8.1 pH Unit	8.11	64 mg/L	64	0.043 mg/L N	0.043	10.3 NTU (0 -	10.3	0.0017 mg/L
PtChev1_WW_2-F	0.024	0.09 mg/L N	0.09	30. ppt	30	0.018 mg/L P	0.018	8.1 pH Unit	8.11	61 mg/L	60.8	0.066 mg/L N	0.066	9.38 NTU (0 -	9.38	0.0017 mg/L
PtChev2_WW_2-A	0.007	0.13 mg/L N	0.13	30.9 ppt	30.9	0.02 mg/L P	0.02	8.1 pH Unit	8.07	91 mg/L	90.6	0.123 mg/L N	0.123	25.1 NTU (0 -	25.1	0.0017 mg/L
PtChev2_WW_2-B	0.003	0.08 mg/L N	0.08	30.6 ppt	30.6	0.018 mg/L P	0.018	8.1 pH Unit	8.09	120 mg/L	120.2	0.077 mg/L N	0.077	24. NTU (0 -	24	0.0015 mg/L
PtChev2_WW_2-C	0.005	< 0.02 mg/L N	0.02	30.6 ppt	30.6	0.019 mg/L P	0.019	8.1 pH Unit	8.11	87 mg/L	87	0.015 mg/L N	0.015	4.89 NTU (0 -	4.89	0.0015 mg/L
PtChev2_WW_2-D	0.16	0.23 mg/L N	0.23	26.4 ppt	26.4	0.018 mg/L P	0.018	8.1 pH Unit	8.12	69 mg/L	68.8	0.07 mg/L N	0.07	9.59 NTU (0 -	9.59	0.0015 mg/L
PtChev2_WW_2-E	0.018	0.04 mg/L N	0.04	29.7 ppt	29.7	0.018 mg/L P	0.018	8.1 pH Unit	8.12	65 mg/L	64.8	0.022 mg/L N	0.022	5.25 NTU (0 -	5.25	0.0017 mg/L
PtChev2_WW_2-F	0.002	< 0.02 mg/L N	0.02	30.3 ppt	30.3	0.018 mg/L P	0.018	8.1 pH Unit	8.11	60 mg/L	59.6	0.018 mg/L N	0.018	3.28 NTU (0 -	3.28	0.0017 mg/L
PtChev3_WW_2-A	0.344	0.63 mg/L N	0.63	31.1 ppt	31.1	0.025 mg/L P	0.025	8.0 pH Unit	7.95	200 mg/L	200.3333333	0.286 mg/L N	0.286	65.8 NTU (0 -	65.8	0.0013 mg/L
PtChev3_WW_2-B	0.007	0.1 mg/L N	0.1	28.2 ppt	28.2	0.02 mg/L P	0.02	8.1 pH Unit	8.09	124 mg/L	124.4	0.093 mg/L N	0.093	25.2 NTU (0 -	25.2	0.0015 mg/L
PtChev3_WW_2-C	0.003	< 0.02 mg/L N	0.02	30.6 ppt	30.6	0.018 mg/L P	0.018	8.1 pH Unit	8.1	94 mg/L	94.2	0.017 mg/L N	0.017	7.29 NTU (0 -	7.29	0.0016 mg/L
PtChev3_WW_2-D	0.007	< 0.02 mg/L N	0.02	29. ppt	29	0.017 mg/L P	0.017	8.1 pH Unit	8.12	89 mg/L	89.4	0.013 mg/L N	0.013	3.6 NTU (0 -	3.6	0.0016 mg/L
PtChev3_WW_2-E	0.11	0.19 mg/L N	0.19	30.6 ppt	30.6	0.018 mg/L P	0.018	8.1 pH Unit	8.12	65 mg/L	65.4	0.08 mg/L N	0.08	8.41 NTU (0 -	8.41	0.0017 mg/L
PtChev3_WW_2-F	0.002	< 0.02 mg/L N	0.02	26.5 ppt	26.5	0.018 mg/L P	0.018	8.1 pH Unit	8.11	63 mg/L	62.8	0.018 mg/L N	0.018	3.46 NTU (0 -	3.46	0.0016 mg/L
PtChev4_WW_2-A	0.543	1.1 mg/L N	1.1	24.6 ppt	24.6	0.025 mg/L P	0.025	7.9 pH Unit	7.87	606 mg/L	605.5	0.557 mg/L N	0.557	325. NTU (0 -	325	0.0013 mg/L
PtChev4_WW_2-B	0.131	0.32 mg/L N	0.32	28.2 ppt	28.2	0.018 mg/L P	0.018	8.0 pH Unit	8.03	181 mg/L	181.4	0.189 mg/L N	0.189	44. NTU (0 -	44	0.0014 mg/L
PtChev4_WW_2-C	0.008	0.12 mg/L N	0.12	30.5 ppt	30.5	0.019 mg/L P	0.019	8.1 pH Unit	8.08	128 mg/L	127.6	0.112 mg/L N	0.112	27.2 NTU (0 -	27.2	0.0017 mg/L
PtChev4_WW_2-D	0.058	0.1 mg/L N	0.1	29.4 ppt	29.4	0.018 mg/L P	0.018	8.1 pH Unit	8.11	125 mg/L	125.4	0.042 mg/L N	0.042	5.58 NTU (0 -	5.58	0.0016 mg/L
PtChev4_WW_2-E	0.031	0.07 mg/L N	0.07	29.2 ppt	29.2	0.018 mg/L P	0.018	8.1 pH Unit	8.11	52 mg/L	52	0.039 mg/L N	0.039	4.73 NTU (0 -	4.73	0.0016 mg/L
PtChev4_WW_2-F	0.002	< 0.02 mg/L N	0.02	30.2 ppt	30.2	0.239 mg/L P	0.239	8.1 pH Unit	8.11	65 mg/L	65.4	0.018 mg/L N	0.018	3.92 NTU (0 -	3.92	0.0016 mg/L

Sample Name	Decimal Result * refer note Arsenic: Soluble by ICPMS-Trace mg/L	Test Result Arsenic: Total by ICPMS-Trace	Decimal Result * refer note Arsenic: Total by ICPMS-Trace mg/L	Test Result Cadmium: Soluble by ICPMS-Trace	Decimal Result * refer note Cadmium: Soluble by ICPMS-Trace mg/L	Test Result Cadmium: Total by ICPMS-Trace	Decimal Result * refer note Cadmium: Total by ICPMS-Trace mg/L	Test Result Chromium: Soluble by ICPMS-Trace	Decimal Result * refer note Chromium: Soluble by ICPMS-Trace mg/L	Test Result Chromium: Total by ICPMS-Trace	Decimal Result * refer note Chromium: Total by ICPMS-Trace mg/L	Test Result Copper: Soluble by ICPMS-Trace	Decimal Result * refer note Copper: Soluble by ICPMS-Trace mg/L	Test Result Copper: Total by ICPMS-Trace	Decimal Result * refer note Copper: Total by ICPMS-Trace mg/L
MEO_DS_Base_20101129	0.00039	0.00056 mg/L	0.00056	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00039 mg/L	0.00039	0.0015 mg/L	0.0015	0.0011 mg/L	0.0011	0.0037 mg/L	0.0037
MEO_HB_Base_20101129	0.001	0.0017 mg/L	0.0017	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	0.0029 mg/L	0.0029	0.003 mg/L	0.003
MEO_MID_Base_20101129	0.0009	0.0011 mg/L	0.0011	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00011 mg/L	0.00011	0.00037 mg/L	0.00037	0.0014 mg/L	0.0014	0.0026 mg/L	0.0026
MEO_US_Base_20101129	0.00043	0.00063 mg/L	0.00063	< 0.00005 mg/L	0.00005	0.00006 mg/L	0.000057	0.0002 mg/L	0.0002	0.001 mg/L	0.001	0.00072 mg/L	0.00072	0.0025 mg/L	0.0025
PtChev_1_Base_20101129	0.0016	0.0034 mg/L	0.0034	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	0.0023 mg/L	0.0023	< 0.002 mg/L	0.002
PtChev_2_Base_20101129	0.0016	0.0031 mg/L	0.0031	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev_3_Base_20101129	0.0015	0.0031 mg/L	0.0031	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev_4_Base_20101129	0.0016	0.0031 mg/L	0.0031	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
MEO_DS_Base_20101201															
Meo_SS 2010121	0.00039	0.00061 mg/L	0.00061	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	< 0.0001 mg/L	0.0001	0.00032 mg/L	0.00032	0.00024 mg/L	0.00024	0.0011 mg/L	0.0011
PtChev_4_Base_20101224	0.0016	0.0034 mg/L	0.0034	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0025 mg/L	0.0025
PtChev_3_Base_20101224	0.0015	0.0034 mg/L	0.0034	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0024 mg/L	0.0024
MEO_HB_Base_20101224	0.0016	0.0037 mg/L	0.0037	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0012 mg/L	0.0012	< 0.002 mg/L	0.002	0.0026 mg/L	0.0026
MEO_MID_Base_20101224	0.00045	0.00076 mg/L	0.00076	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00034 mg/L	0.00034	0.0004 mg/L	0.0004	0.00074 mg/L	0.00074	0.002 mg/L	0.002
MEO_DS_Base_20101224	0.00044	0.00083 mg/L	0.00083	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00042 mg/L	0.00042	0.00054 mg/L	0.00054	0.00085 mg/L	0.00085	0.002 mg/L	0.002
MEO_US_Base_20101224	0.0012	0.0025 mg/L	0.0025	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0011 mg/L	0.0011	0.002 mg/L	0.002	0.00084 mg/L	0.00084	0.0021 mg/L	0.0021
PtChev_1_Base_20101224	0.0015	0.0037 mg/L	0.0037	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0033 mg/L	0.0033
PtChev_2_Base_20101224	0.0018	0.0033 mg/L	0.0033	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0042 mg/L	0.0042
Meo_OF_Base_20101224	0.0014	0.0025 mg/L	0.0025	< 0.00005 mg/L	0.00005	0.00012 mg/L	0.00012	0.00022 mg/L	0.00022	0.00034 mg/L	0.00034	0.011 mg/L	0.011	0.032 mg/L	0.032
PtChev_1_Base_20110127	0.0018	0.0026 mg/L	0.0026	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev_2_Base_20110127	0.0017	< 0.001 mg/L	0.001	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev_3_Base_20110127	0.0015	< 0.001 mg/L	0.001	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev_4_Base_20110127	0.0017	0.019 mg/L	0.019	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.002 mg/L	0.002	0.04 mg/L	0.04
MEO_MID_Base_20110127	0.00046	0.00052 mg/L	0.00052	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00042 mg/L	0.00042	0.00072 mg/L	0.00072	0.00069 mg/L	0.00069	0.0014 mg/L	0.0014
MEO_US_Base_20110127	0.00097	0.0016 mg/L	0.0016	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00094 mg/L	0.00094	0.0019 mg/L	0.0019	0.00082 mg/L	0.00082	0.0017 mg/L	0.0017
MEO_HB_Base_20110127	0.001	0.02 mg/L	0.02	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.002 mg/L	0.002	0.038 mg/L	0.038
MEO_DS_Base_20110127	0.00036	0.0004 mg/L	0.0004	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00037 mg/L	0.00037	0.00077 mg/L	0.00077	0.00063 mg/L	0.00063	0.0011 mg/L	0.0011
Meo_OF_Base_20110127	0.0011	0.0013 mg/L	0.0013	< 0.00005 mg/L	0.00005	0.0001 mg/L	0.000097	0.0004 mg/L	0.0004	0.00084 mg/L	0.00084	0.0073 mg/L	0.0073	0.014 mg/L	0.014
Meo_OF_RCT_Base_20110127	0.00049	0.0033 mg/L	0.0033	< 0.00005 mg/L	0.00005	0.00018 mg/L	0.00018	0.00023 mg/L	0.00023	0.0089 mg/L	0.0089	0.0014 mg/L	0.0014	0.024 mg/L	0.024
MEO_SW_WW_1_000	0.015	0.017 mg/L	0.017	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0098 mg/L	0.0098	0.012 mg/L	0.012	0.014 mg/L	0.014	0.027 mg/L	0.027
MEO_SW_WW_1_010	0.015	0.016 mg/L	0.016	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0087 mg/L	0.0087	0.011 mg/L	0.011	0.012 mg/L	0.012	0.024 mg/L	0.024
MEO_SW_WW_1_020	0.014	0.015 mg/L	0.015	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0083 mg/L	0.0083	0.01 mg/L	0.01	0.012 mg/L	0.012	0.022 mg/L	0.022
MEO_SW_WW_1_030	0.016	0.016 mg/L	0.016	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0091 mg/L	0.0091	0.011 mg/L	0.011	0.011 mg/L	0.011	0.021 mg/L	0.021
MEO_SW_WW_1_060	0.013	0.014 mg/L	0.014	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0073 mg/L	0.0073	0.0087 mg/L	0.0087	0.0096 mg/L	0.0096	0.017 mg/L	0.017
MEO_SW_WW_1_120	0.017	0.018 mg/L	0.018	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0094 mg/L	0.0094	0.011 mg/L	0.011	0.011 mg/L	0.011	0.018 mg/L	0.018
MEO_CSO_WW_1_000	0.00096	0.0033 mg/L	0.0033	< 0.00005 mg/L	0.00005	0.00006 mg/L	0.000061	0.00033 mg/L	0.00033	0.0028 mg/L	0.0028	0.0047 mg/L	0.0047	0.044 mg/L	0.044
MEO_CSO_WW_1_010	0.0009	0.0016 mg/L	0.0016	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00033 mg/L	0.00033	0.0017 mg/L	0.0017	0.0035 mg/L	0.0035	0.021 mg/L	0.021
MEO_CSO_WW_1_020	0.00097	0.0016 mg/L	0.0016	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00037 mg/L	0.00037	0.0017 mg/L	0.0017	0.0023 mg/L	0.0023	0.016 mg/L	0.016
MEO_CSO_WW_1_030	0.00092	0.0016 mg/L	0.0016	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00034 mg/L	0.00034	0.0017 mg/L	0.0017	0.0032 mg/L	0.0032	0.016 mg/L	0.016
MEO_CSO_WW_1_060	0.00098	0.0012 mg/L	0.0012	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00036 mg/L	0.00036	0.001 mg/L	0.001	0.0025 mg/L	0.0025	0.011 mg/L	0.011
MEO_CSO_WW_1_120	0.00098	0.0013 mg/L	0.0013	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00039 mg/L	0.00039	0.00098 mg/L	0.00098	0.0036 mg/L	0.0036	0.01 mg/L	0.01
PtChev2_WW_1-A	0.0016	0.0029 mg/L	0.0029	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_1-B	0.0017	0.0031 mg/L	0.0031	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0015 mg/L	0.0015	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_1-C	0.0017	0.0028 mg/L	0.0028	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_1-D	0.0017	0.0027 mg/L	0.0027	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_1-E	0.0016	0.0031 mg/L	0.0031	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_1-F	0.0019	0.0028 mg/L	0.0028	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev3_WW_1-A	0.0016	0.003 mg/L	0.003	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0013 mg/L	0.0013	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev3_WW_1-B	0.0018	0.0026 mg/L	0.0026	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev3_WW_1-C	0.0017	0.0029 mg/L	0.0029	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev3_WW_1-D	0.0019	0.0027 mg/L	0.0027	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0012 mg/L	0.0012	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev3_WW_1-E	0.0017	0.0029 mg/L	0.0029	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev3_WW_1-F	0.0016	0.0026 mg/L	0.0026	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0023 mg/L	0.0023
PtChev4_WW_1-A	0.0017	0.0028 mg/L	0.0028	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev4_WW_1-B	0.0018	0.0034 mg/L	0.0034	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0023 mg/L	0.0023	< 0.002 mg/L	0.002	0.0025 mg/L	0.0025
PtChev4_WW_1-C	0.0018	0.003 mg/L	0.003	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev4_WW_1-D	0.0017	0.0028 mg/L	0.0028	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.001 mg/L	0.001	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev4_WW_1-E	0.0018	0.0027 mg/L	0.0027	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0028 mg/L	0.0028	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev4_WW_1-F	0.0018	0.0028 mg/L	0.0028	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
Meo_HB_WW_1-000	0.001	0.0019 mg/L	0.0019	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0011 mg/L	0.0011	< 0.002 mg/L	0.002	0.0023 mg/L	0.0023
Meo_HB_WW_1-030	0.001	0.0018 mg/L	0.0018	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0015 mg/L	0.0015	< 0.002 mg/L	0.002	0.0032 mg/L	0.0032
Meo_HB_WW_1-060	0.001	0.0017 mg/L	0.0017	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0016 mg/L	0.0016	< 0.002 mg/L	0.002	0.0036 mg/L	0.0036
Meo_HB_WW_1-120	0.001	0.0021 mg/L	0.0021	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0022 mg/L	0.0022	< 0.002 mg/L	0.002	0.0089 mg/L	0.0089
Meo_HB_WW_1-180	0.0016	0.0029 mg/L	0.0029	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.003 mg/L	0.003	< 0.002 mg/L	0.002	0.01 mg/L	0.01
Meo_HB_WW_1-240	0.0018	0.0028 mg/L	0.0028	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.003 mg/L	0.003	< 0.002 mg/L	0.002	0.011 mg/L	0.011
PtChev1_WW_1-A	0.0017	0.0027 mg/L	0.0027	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev1_WW_1-B	0.0018	0.0034 mg/L	0.0034	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0027 mg/L	0.0027	< 0.002 mg/L	0.002	0.0035 mg/L	0.0035
PtChev1_WW_1-C	0.0018	0.0034 mg/L	0.0034	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.003 mg/L	0.003	< 0.002 mg/L	0.002	0.0036 mg/L	0.0036
PtChev1_WW_1-D	0.0018	0.0031 mg/L	0.0031	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev1_WW_1-E	0.0017	0.0023 mg/L	0.0023	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev1_WW_1-F	0.0018	0.0027 mg/L	0.0027	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
MEO_DS_WW_1_000	0.00064	0.00073 mg/L	0.00073	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00057 mg/L	0.00057	0.0007 mg/L	0.0007	0.0014 mg/L	0.0014	0.0047 mg/L	0.0047
MEO_DS_WW_1_030	0.00067	0.00084 mg/L	0.00084	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00048 mg/L	0.00048	0.00074 mg/L	0.00074	0.0019 mg/L	0.0019	0.0043 mg/L	0.0043
MEO_DS_WW_1_060	0.0011	0.0016 mg/L	0.0016	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00079 mg/L	0.00079	0.0015 mg/L	0.0015	0.0033 mg/L	0.0033	0.0078 mg/L	0.0078
MEO_DS_WW_1_120	0.002	0.0024 mg/L	0.0024	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00099 mg/L	0.00099	0.0019 mg/L	0.0019	0.0034 mg/L	0.0034	0.0094 mg/L	0.0094
MEO_DS_WW_1_180	0.0017	0.0019 mg/L	0.0019	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00073 mg/L	0.00073	0.0013 mg/L	0.0013	0.003 mg/L	0.003	0.0073 mg/L	0.0073
MEO_DS_WW_1_240	0.0017	0.0028 mg/L	0.0028	< 0.00005 mg/L	0.00005	0.00006 mg/L	0.000056	0.00067 mg/L	0.00067	0.003 mg/L	0.003	0.002 mg/L	0.002	0.012 mg/L	0.012
Meo_US_WW_1-000	0.0011	0.002 mg/L	0.002	< 0.00005 mg/L	0.00005	0.00008 mg/L	0.000081	0.00059 mg/L	0.00059	0.0034 mg/L	0.0034	0.0049 mg/L	0.0049	0.027 mg/L	0.027
Meo_US_WW_1-030	0.001	0.0014 mg/L	0.0014	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00045 mg/L	0.00045	0.0013 mg/L	0.0013	0.003 mg/L	0.003	0.008 mg/L	0.008
Meo_US_WW_1-060	0.0012	0.0016 mg/L	0.0016	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00071 mg/L	0.00071	0.0014 mg/L	0.0014	0.0026 mg/L	0.0026	0.006 mg/L	0.006
Meo_US_WW_1-120	0.0016	0.0023 mg/L	0.0023	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0014 mg/L	0.0014	0.0021 mg/L	0.0021	0.0021 mg/L	0.0021	0.0044 mg/L	0.0044
Meo_US_WW_1-180	0.0015	0.0019 mg/L	0.0019	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0012 mg/L	0.0012	0.002 mg/L	0.002	0.0012 mg/L	0.0012	0.0046 mg/L	0.0046
Meo_US_WW_1-240	0.0025	0.0029 mg/L	0.0029	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0025 mg/L	0.0025	0.0033 mg/L	0.0033	0.0021 mg/L	0.0021	0.0044 mg/L	0.0044
MEO_SW_WW_2_000	0.0035	0.0056 mg/L	0.0056	< 0.00005 mg/L	0.00005	0.00008 mg/L	0.000077	0.003 mg/L	0.003	0.005 mg/L	0.005	0.016 mg/L	0.016	0.026 mg/L	0.026
MEO_SW_WW_2_010	0.0045	0.012 mg/L	0.012	< 0.00005 mg/L	0.00005	0.00015 mg/L	0.00015	0.0037 mg/L	0.0037	0.012 mg/L	0.012	0.015 mg/L	0.015	0.041 mg/L	0.041
MEO_SW_WW_2_020	0.0089	0.016 mg/L	0.016	< 0.00005 mg/L	0.00005	0.00009 mg/L	0.00009	0.0064 mg/L	0.0064	0.013 mg/L	0.013	0.015 mg/L	0.015	0.04 mg/L	0.04
MEO_SW_WW_2_030	0.0065	0.0082 mg/L	0.0082	< 0.00005 mg/L	0.00005	0.00007 mg/L	0.000071	0.0041 mg/L	0.0041	0.0065 mg/L	0.0065	0.014 mg/L	0.014	0.026 mg/L	0.026
MEO_SW_WW_2_060	0.0075	0.009 mg/L	0.009	< 0.00005 mg/L	0.00005	0.00006 mg/L	0.000058	0.0049 mg/L	0.0049	0.0071 mg/L	0.0071	0.014 mg/L	0.014	0.024 mg/L	0.024
MEO_SW_WW_2_120	0.0055	0.0075 mg/L	0.0075	< 0.00005 mg/L	0.00005	0.00013 mg/L	0.00013	0.0039 mg/L	0.0039	0.0078 mg/L	0.0078	0.016 mg/L	0.016	0.045 mg/L	0.045
MEO_CSO_WW_2_000	0.0016	0.0036 mg/L	0.0036	< 0.00005 mg/L	0.00005	0.00029 mg/L	0.00029	0.00076 mg/L	0.00076	0.0087 mg/L	0.0087	0.0058 mg/L	0.0058	0.061 mg/L	0.061
MEO_CSO_WW_2_010	0.00088	0.0026 mg/L	0.0026	< 0.00005 mg/L	0.00005	0.00021 mg/L	0.00021	0.00032 mg/L	0.00032	0.0058 mg/L	0.0058	0.0046 mg/L	0.0046	0.058 mg/L	0.058
MEO_CSO_WW_2_020	0.0008	0.002 mg/L	0.002	< 0.00005 mg/L	0.00005	0.00013 mg/L	0.00013	0.00045 mg/L	0.00045	0.004 mg/L	0.004	0.0029 mg/L	0.0029	0.042 mg/L	0.042
MEO_CSO_WW_2_030	0.00071	0.0018 mg/L	0.0018	< 0.00005 mg/L	0.00005	0.00013 mg/L	0.00013	0.00029 mg/L	0.00029	0.0035 mg/L	0.0035	0.0035 mg/L	0.0035	0.039 mg/L	0.039
MEO_CSO_WW_2_060	0.0007	0.0013 mg/L	0.0013	< 0.00005 mg/L	0.00005	0.00007 mg/L	0.000073	0.00048 mg/L	0.00048	0.0018 mg/L	0.0018	0.0049 mg/L	0.0049	0.022 mg/L	0.022
Meo_US_WW_2-000	0.00087	0.0013 mg/L	0.0013	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00054 mg/L	0.00054	0.0023 mg/L	0.0023	0.0064 mg/L	0.0064	0.015 mg/L	0.015
Meo_US_WW_2-030	0.0011	0.0015 mg/L	0.0015	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00051 mg/L	0.00051	0.0015 mg/L	0.0015	0.0055 mg/L	0.0055	0.011 mg/L	0.011
Meo_US_WW_2-060	0.0016	0.0022 mg/L	0.0022	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00064 mg/L	0.00064	0.0012 mg/L	0.0012	0.0051 mg/L	0.0051	0.0093 mg/L	0.0093
Meo_US_WW_2-120	0.00093	0.0012 mg/L	0.0012	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00046 mg/L	0.00046	0.0025 mg/L	0.0025	0.0077 mg/L	0.0077	0.014 mg/L	0.014
Meo_US_WW_2-180	0.0021	0.0044 mg/L	0.0044	< 0.00005 mg/L	0.00005	0.00006 mg/L	0.000062	0.0016 mg/L	0.0016	0.0051 mg/L	0.0051	0.0028 mg/L	0.0028	0.012 mg/L	0.012
Meo_US_WW_2-240	0.0021	0.003 mg/L	0.003	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.0015 mg/L	0.0015	0.0028 mg/L	0.0028	0.0025 mg/L	0.0025	0.0074 mg/L	0.0074
Meo_HB_WW_2-000	0.001	0.0015 mg/L	0.0015	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0025 mg/L	0.0025	< 0.002 mg/L	0.002	0.0051 mg/L	0.0051
Meo_HB_WW_2-030	0.001	0.0021 mg/L	0.0021	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0025 mg/L	0.0025	< 0.002 mg/L	0.002	0.007 mg/L	0.007
Meo_HB_WW_2-060	0.001	0.0024 mg/L	0.0024	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0019 mg/L	0.0019	< 0.002 mg/L	0.002	0.0056 mg/L	0.0056
Meo_HB_WW_2-120	0.001	0.0017 mg/L	0.0017	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0027 mg/L	0.0027	< 0.002 mg/L	0.002	0.0056 mg/L	0.0056
Meo_HB_WW_2-180	0.001	0.0048 mg/L	0.0048	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0083 mg/L	0.0083	< 0.002 mg/L	0.002	0.027 mg/L	0.027
Meo_HB_WW_2-240	0.001	0.0053 mg/L	0.0053	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.013 mg/L	0.013	0.0032 mg/L	0.0032	0.04 mg/L	0.04
MEO_DS_WW_2_000	0.00034	0.00036 mg/L	0.00036	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00059 mg/L	0.00059	0.00072 mg/L	0.00072	0.00086 mg/L	0.00086	0.0014 mg/L	0.0014
MEO_DS_WW_2_030	0.00036	0.00046 mg/L	0.00046	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00057 mg/L	0.00057	0.0039 mg/L	0.0039	0.0011 mg/L	0.0011	0.002 mg/L	0.002
MEO_DS_WW_2_060	0.00042	0.00049 mg/L	0.00049	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00063 mg/L	0.00063	0.00097 mg/L	0.00097	0.0016 mg/L	0.0016	0.0028 mg/L	0.0028
MEO_DS_WW_2_120	0.0011	0.0015 mg/L	0.0015	< 0.00005 mg/L	0.00005	< 0.00005 mg/L	0.00005	0.00065 mg/L	0.00065	0.0017 mg/L	0.0017	0.0048 mg/L	0.0048	0.012 mg/L	0.012
MEO_DS_WW_2_180	0.0012	0.0017 mg/L	0.0017	< 0.00005 mg/L	0.00005	0.00005 mg/L	0.000051	0.00064 mg/L	0.00064	0.002 mg/L	0.002	0.0038 mg/L	0.0038	0.011 mg/L	0.011
MEO_DS_WW_2_240	0.0013	0.004 mg/L	0.004	< 0.00005 mg/L	0.00005	0.00017 mg/L	0.00017	0.00057 mg/L	0.00057	0.0079 mg/L	0.0079	0.0025 mg/L	0.0025	0.033 mg/L	0.033
PtChev1_WW_2-A	0.0015	0.0032 mg/L	0.0032	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0017 mg/L	0.0017	< 0.002 mg/L	0.002	0.0035 mg/L	0.0035
PtChev1_WW_2-B	0.0014	0.0019 mg/L	0.0019	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev1_WW_2-C	0.0015	0.0019 mg/L	0.0019	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev1_WW_2-D	0.0018	0.0021 mg/L	0.0021	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev1_WW_2-E	0.0017	0.0017 mg/L	0.0017	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev1_WW_2-F	0.0017	0.0023 mg/L	0.0023	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_2-A	0.0017	0.0025 mg/L	0.0025	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0021 mg/L	0.0021
PtChev2_WW_2-B	0.0015	0.0023 mg/L	0.0023	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_2-C	0.0015	0.002 mg/L	0.002	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_2-D	0.0015	0.0023 mg/L	0.0023	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev2_WW_2-E	0.0017	0.0021 mg/L	0.0021	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0022 mg/L	0.0022
PtChev2_WW_2-F	0.0017	0.0025 mg/L	0.0025	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0016 mg/L	0.0016	< 0.002 mg/L	0.002	0.0029 mg/L	0.0029
PtChev3_WW_2-A	0.0013	0.0027 mg/L	0.0027	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.003 mg/L	0.003
PtChev3_WW_2-B	0.0015	0.0017 mg/L	0.0017	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0023 mg/L	0.0023
PtChev3_WW_2-C	0.0016	0.0019 mg/L	0.0019	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0027 mg/L	0.0027
PtChev3_WW_2-D	0.0016	0.0019 mg/L	0.0019	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0024 mg/L	0.0024
PtChev3_WW_2-E	0.0017	0.0024 mg/L	0.0024	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev3_WW_2-F	0.0016	0.0022 mg/L	0.0022	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002
PtChev4_WW_2-A	0.0013	0.0067 mg/L	0.0067	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0047 mg/L	0.0047	< 0.002 mg/L	0.002	0.013 mg/L	0.013
PtChev4_WW_2-B	0.0014	0.0029 mg/L	0.0029	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0026 mg/L	0.0026
PtChev4_WW_2-C	0.0017	0.0029 mg/L	0.0029	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	0.0011 mg/L	0.0011	< 0.002 mg/L	0.002	0.0034 mg/L	0.0034
PtChev4_WW_2-D	0.0016	0.0019 mg/L	0.0019	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.0022 mg/L	0.0022
PtChev4_WW_2-E	0.0016	0.0023 mg/L	0.0023	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	0.018 mg/L	0.018
PtChev4_WW_2-F	0.0016	0.0019 mg/L	0.0019	< 0.0005 mg/L	0.0005	< 0.0005 mg/L	0.0005	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.002 mg/L	0.002	< 0.002 mg/L	0.002

Sample Name	Nitric/Hydrochloric Acid Digest (4:1 Ratio)	Filtration for Soluble Metals	Test Result Nickel: Soluble by ICPMS-Trace	Decimal Result * refer note Nickel: Soluble by ICPMS-Trace mg/L	Test Result Nickel: Total by ICPMS-Trace	Decimal Result * refer note Nickel: Total by ICPMS-Trace mg/L	Test Result Lead: Soluble by ICPMS-Trace	Decimal Result * refer note Lead: Soluble by ICPMS-Trace mg/L	Test Result Lead: Total by ICPMS-Trace	Decimal Result * refer note Lead: Total by ICPMS-Trace mg/L	Test Result Zinc: Soluble by ICPMS-Trace	Decimal Result * refer note Zinc: Soluble by ICPMS-Trace mg/L	Test Result Zinc: Total by ICPMS-Trace	Decimal Result * refer note Zinc: Total by ICPMS-Trace mg/L	Test Result TPH Band C7-C9
MEO_DS_Base_20101129	1	Yes	0.00027 mg/L	0.00027	0.00079 mg/L	0.00079	0.00015 mg/L	0.00015	0.0052 mg/L	0.0052	0.0066 mg/L	0.0066	0.026 mg/L	0.026	< 0.20 mg/l
MEO_HB_Base_20101129	1	Yes	< 0.001 mg/L	0.001	0.002 mg/L	0.002	< 0.001 mg/L	0.001	0.0017 mg/L	0.0017	0.012 mg/L	0.012	0.025 mg/L	0.025	< 0.20 mg/l
MEO_MID_Base_20101129	1	Yes	0.00066 mg/L	0.00066	0.00089 mg/L	0.00089	0.00018 mg/L	0.00018	0.00094 mg/L	0.00094	0.0058 mg/L	0.0058	0.015 mg/L	0.015	< 0.20 mg/l
MEO_US_Base_20101129	1	Yes	0.00029 mg/L	0.00029	0.00067 mg/L	0.00067	< 0.0001 mg/L	0.0001	0.0012 mg/L	0.0012	0.0088 mg/L	0.0088	0.047 mg/L	0.047	< 0.20 mg/l
PtChev_1_Base_20101129	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev_2_Base_20101129	1	Yes	< 0.001 mg/L	0.001	0.0015 mg/L	0.0015	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev_3_Base_20101129	1	Yes	< 0.001 mg/L	0.001	0.0012 mg/L	0.0012	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev_4_Base_20101129	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	0.01 mg/L	0.01	< 0.20 mg/l
MEO_DS_Base_20101201															
Meo_SS 2010121	1	Yes	0.0005 mg/L	0.0005	0.00073 mg/L	0.00073	< 0.0001 mg/L	0.0001	0.00053 mg/L	0.00053	0.0032 mg/L	0.0032	0.0074 mg/L	0.0074	< 0.25 mg/l
PtChev_4_Base_20101224	1	Yes	0.0025 mg/L	0.0025	0.0014 mg/L	0.0014	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev_3_Base_20101224	1	Yes	< 0.001 mg/L	0.001	0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
MEO_HB_Base_20101224	1	Yes	0.0012 mg/L	0.0012	0.0016 mg/L	0.0016	< 0.001 mg/L	0.001	0.0012 mg/L	0.0012	< 0.01 mg/L	0.01	0.01 mg/L	0.01	< 0.20 mg/l
MEO_MID_Base_20101224	1	Yes	0.00022 mg/L	0.00022	0.00041 mg/L	0.00041	< 0.0001 mg/L	0.0001	0.00033 mg/L	0.00033	0.0055 mg/L	0.0055	0.016 mg/L	0.016	< 0.20 mg/l
MEO_DS_Base_20101224	1	Yes	0.00017 mg/L	0.00017	0.0004 mg/L	0.0004	< 0.0001 mg/L	0.0001	0.00085 mg/L	0.00085	0.0089 mg/L	0.0089	0.026 mg/L	0.026	< 0.20 mg/l
MEO_US_Base_20101224	1	Yes	0.00027 mg/L	0.00027	0.00049 mg/L	0.00049	< 0.0001 mg/L	0.0001	0.00051 mg/L	0.00051	0.0091 mg/L	0.0091	0.025 mg/L	0.025	< 0.20 mg/l
PtChev_1_Base_20101224	1	Yes	< 0.001 mg/L	0.001	0.0098 mg/L	0.0098	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	0.014 mg/L	0.014	< 0.20 mg/l
PtChev_2_Base_20101224	1	Yes	< 0.001 mg/L	0.001	0.0011 mg/L	0.0011	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
Meo_OF_Base_20101224	1	Yes	0.0012 mg/L	0.0012	0.002 mg/L	0.002	0.0004 mg/L	0.0004	0.0019 mg/L	0.0019	0.016 mg/L	0.016	0.12 mg/L	0.12	< 0.25 mg/l
PtChev_1_Base_20110127	1	Yes	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.01 mg/L	0.01	< 0.01 mg/L	0.01	< 0.20 mg/l
PtChev_2_Base_20110127	1	Yes	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.01 mg/L	0.01	< 0.01 mg/L	0.01	< 0.20 mg/l
PtChev_3_Base_20110127	1	Yes	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.001 mg/L	0.001	< 0.01 mg/L	0.01	< 0.01 mg/L	0.01	< 0.20 mg/l
PtChev_4_Base_20110127	1	Yes	< 0.001 mg/L	0.001	0.059 mg/L	0.059	< 0.001 mg/L	0.001	0.0025 mg/L	0.0025	< 0.01 mg/L	0.01	0.25 mg/L	0.25	< 0.20 mg/l
MEO_MID_Base_20110127	1	Yes	0.00018 mg/L	0.00018	0.00032 mg/L	0.00032	< 0.0001 mg/L	0.0001	0.00061 mg/L	0.00061	0.01 mg/L	0.01	0.012 mg/L	0.012	< 0.20 mg/l
MEO_US_Base_20110127	1	Yes	0.00032 mg/L	0.00032	0.0004 mg/L	0.0004	< 0.0001 mg/L	0.0001	0.00018 mg/L	0.00018	0.011 mg/L	0.011	0.012 mg/L	0.012	< 0.20 mg/l
MEO_HB_Base_20110127	1	Yes	< 0.001 mg/L	0.001	0.058 mg/L	0.058	< 0.001 mg/L	0.001	0.0019 mg/L	0.0019	< 0.01 mg/L	0.01	0.25 mg/L	0.25	< 0.20 mg/l
MEO_DS_Base_20110127	1	Yes	0.00021 mg/L	0.00021	0.00028 mg/L	0.00028	< 0.0001 mg/L	0.0001	0.0002 mg/L	0.0002	0.0066 mg/L	0.0066	0.0078 mg/L	0.0078	< 0.20 mg/l
Meo_OF_Base_20110127	1	Yes	0.0011 mg/L	0.0011	0.0015 mg/L	0.0015	0.00059 mg/L	0.00059	0.0016 mg/L	0.0016	0.018 mg/L	0.018	0.048 mg/L	0.048	< 0.20 mg/l
Meo_OF_RCT_Base_20110127	1	Yes	0.00049 mg/L	0.00049	0.0073 mg/L	0.0073	< 0.0001 mg/L	0.0001	0.026 mg/L	0.026	0.0044 mg/L	0.0044	0.11 mg/L	0.11	< 0.20 mg/l
MEO_SW_WW_1_000	1	Yes	< 0.0001 mg/L	0.0001	0.001 mg/L	0.001	0.00061 mg/L	0.00061	0.0077 mg/L	0.0077	0.14 mg/L	0.14	0.24 mg/L	0.24	< 0.20 mg/l
MEO_SW_WW_1_010	1	Yes	< 0.0001 mg/L	0.0001	0.0011 mg/L	0.0011	0.00045 mg/L	0.00045	0.006 mg/L	0.006	0.13 mg/L	0.13	0.2 mg/L	0.2	< 0.20 mg/l
MEO_SW_WW_1_020	1	Yes	< 0.0001 mg/L	0.0001	0.001 mg/L	0.001	0.00054 mg/L	0.00054	0.0055 mg/L	0.0055	0.12 mg/L	0.12	0.18 mg/L	0.18	< 0.20 mg/l
MEO_SW_WW_1_030	1	Yes	< 0.0001 mg/L	0.0001	0.00086 mg/L	0.00086	0.0004 mg/L	0.0004	0.005 mg/L	0.005	0.11 mg/L	0.11	0.17 mg/L	0.17	< 0.20 mg/l
MEO_SW_WW_1_060	1	Yes	< 0.0001 mg/L	0.0001	0.00064 mg/L	0.00064	0.00051 mg/L	0.00051	0.0035 mg/L	0.0035	0.11 mg/L	0.11	0.16 mg/L	0.16	< 0.20 mg/l
MEO_SW_WW_1_120	1	Yes	< 0.0001 mg/L	0.0001	0.00061 mg/L	0.00061	0.00048 mg/L	0.00048	0.0022 mg/L	0.0022	0.11 mg/L	0.11	0.15 mg/L	0.15	< 0.20 mg/l
MEO_CSO_WW_1_000	1	Yes	< 0.0001 mg/L	0.0001	0.002 mg/L	0.002	0.00057 mg/L	0.00057	0.01 mg/L	0.01	0.065 mg/L	0.065	0.17 mg/L	0.17	< 0.20 mg/l
MEO_CSO_WW_1_010	1	Yes	< 0.0001 mg/L	0.0001	0.0013 mg/L	0.0013	0.00047 mg/L	0.00047	0.0082 mg/L	0.0082	0.062 mg/L	0.062	0.16 mg/L	0.16	< 0.20 mg/l
MEO_CSO_WW_1_020	1	Yes	< 0.0001 mg/L	0.0001	0.0013 mg/L	0.0013	0.00031 mg/L	0.00031	0.0076 mg/L	0.0076	0.053 mg/L	0.053	0.14 mg/L	0.14	< 0.20 mg/l
MEO_CSO_WW_1_030	1	Yes	< 0.0001 mg/L	0.0001	0.0013 mg/L	0.0013	0.00046 mg/L	0.00046	0.0072 mg/L	0.0072	0.056 mg/L	0.056	0.14 mg/L	0.14	< 0.20 mg/l
MEO_CSO_WW_1_060	1	Yes	< 0.0001 mg/L	0.0001	0.00076 mg/L	0.00076	0.00031 mg/L	0.00031	0.0049 mg/L	0.0049	0.055 mg/L	0.055	0.11 mg/L	0.11	< 0.20 mg/l
MEO_CSO_WW_1_120	1	Yes	< 0.0001 mg/L	0.0001	0.00077 mg/L	0.00077	0.00051 mg/L	0.00051	0.0038 mg/L	0.0038	0.061 mg/L	0.061	0.11 mg/L	0.11	< 0.20 mg/l
PtChev2_WW_1-A	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_1-B	1	Yes	< 0.001 mg/L	0.001	0.0021 mg/L	0.0021	< 0.001 mg/L	0.001	0.0014 mg/L	0.0014	< 0.01 mg/L	0.01	0.013 mg/L	0.013	< 0.20 mg/l
PtChev2_WW_1-C	1	Yes	< 0.001 mg/L	0.001	0.0014 mg/L	0.0014	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_1-D	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_1-E	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_1-F	1	Yes	< 0.001 mg/L	0.001	0.0011 mg/L	0.0011	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_1-A	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0012 mg/L	0.0012	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_1-B	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_1-C	1	Yes	< 0.001 mg/L	0.001	0.0016 mg/L	0.0016	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_1-D	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.001 mg/L	0.001	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_1-E	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_1-F	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_1-A	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_1-B	1	Yes	< 0.001 mg/L	0.001	0.0011 mg/L	0.0011	< 0.001 mg/L	0.001	0.0023 mg/L	0.0023	< 0.01 mg/L	0.01	0.013 mg/L	0.013	< 0.20 mg/l
PtChev4_WW_1-C	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_1-D	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	0.014 mg/L	0.014	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_1-E	1	Yes	< 0.001 mg/L	0.001	0.0019 mg/L	0.0019	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_1-F	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
Meo_HB_WW_1-000	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0022 mg/L	0.0022	0.019 mg/L	0.019	0.026 mg/L	0.026	< 0.20 mg/l
Meo_HB_WW_1-030	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0034 mg/L	0.0034	0.025 mg/L	0.025	0.037 mg/L	0.037	< 0.20 mg/l
Meo_HB_WW_1-060	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0042 mg/L	0.0042	0.02 mg/L	0.02	0.033 mg/L	0.033	< 0.20 mg/l
Meo_HB_WW_1-120	1	Yes	< 0.001 mg/L	0.001	0.0016 mg/L	0.0016	< 0.001 mg/L	0.001	0.0088 mg/L	0.0088	0.028 mg/L	0.028	0.057 mg/L	0.057	< 0.20 mg/l
Meo_HB_WW_1-180	1	Yes	< 0.001 mg/L	0.001	0.0014 mg/L	0.0014	< 0.001 mg/L	0.001	0.011 mg/L	0.011	0.026 mg/L	0.026	0.17 mg/L	0.17	< 0.20 mg/l
Meo_HB_WW_1-240	1	Yes	< 0.001 mg/L	0.001	0.0016 mg/L	0.0016	< 0.001 mg/L	0.001	0.013 mg/L	0.013	0.028 mg/L	0.028	0.08 mg/L	0.08	< 0.20 mg/l
PtChev1_WW_1-A	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev1_WW_1-B	1	Yes	< 0.001 mg/L	0.001	0.0013 mg/L	0.0013	< 0.001 mg/L	0.001	0.0033 mg/L	0.0033	< 0.01 mg/L	0.01	0.018 mg/L	0.018	< 0.20 mg/l
PtChev1_WW_1-C	1	Yes	< 0.001 mg/L	0.001	0.0017 mg/L	0.0017	< 0.001 mg/L	0.001	0.0038 mg/L	0.0038	< 0.01 mg/L	0.01	0.021 mg/L	0.021	< 0.20 mg/l
PtChev1_WW_1-D	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev1_WW_1-E	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev1_WW_1-F	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
MEO_DS_WW_1_000	1	Yes	< 0.0001 mg/L	0.0001	0.00052 mg/L	0.00052	0.00022 mg/L	0.00022	0.0012 mg/L	0.0012	0.013 mg/L	0.013	0.019 mg/L	0.019	< 0.20 mg/l
MEO_DS_WW_1_030	1	Yes	< 0.0001 mg/L	0.0001	0.00049 mg/L	0.00049	0.0003 mg/L	0.0003	0.0019 mg/L	0.0019	0.015 mg/L	0.015	0.022 mg/L	0.022	< 0.20 mg/l
MEO_DS_WW_1_060	1	Yes	< 0.0001 mg/L	0.0001	0.0008 mg/L	0.0008	0.00041 mg/L	0.00041	0.0044 mg/L	0.0044	0.02 mg/L	0.02	0.04 mg/L	0.04	< 0.20 mg/l
MEO_DS_WW_1_120	1	Yes	< 0.0001 mg/L	0.0001	0.0011 mg/L	0.0011	0.00034 mg/L	0.00034	0.0051 mg/L	0.0051	0.031 mg/L	0.031	0.065 mg/L	0.065	< 0.20 mg/l
MEO_DS_WW_1_180	1	Yes	< 0.0001 mg/L	0.0001	0.00077 mg/L	0.00077	0.00036 mg/L	0.00036	0.0034 mg/L	0.0034	0.032 mg/L	0.032	0.057 mg/L	0.057	< 0.20 mg/l
MEO_DS_WW_1_240	1	Yes	< 0.0001 mg/L	0.0001	0.0016 mg/L	0.0016	0.00033 mg/L	0.00033	0.015 mg/L	0.015	0.032 mg/L	0.032	0.11 mg/L	0.11	< 0.20 mg/l
Meo_US_WW_1-000	1	Yes	< 0.0001 mg/L	0.0001	0.0023 mg/L	0.0023	0.00098 mg/L	0.00098	0.019 mg/L	0.019	0.056 mg/L	0.056	0.23 mg/L	0.23	< 0.20 mg/l
Meo_US_WW_1-030	1	Yes	< 0.0001 mg/L	0.0001	0.00077 mg/L	0.00077	0.00047 mg/L	0.00047	0.0045 mg/L	0.0045	0.06 mg/L	0.06	0.098 mg/L	0.098	< 0.20 mg/l
Meo_US_WW_1-060	1	Yes	< 0.0001 mg/L	0.0001	0.00057 mg/L	0.00057	0.00044 mg/L	0.00044	0.0029 mg/L	0.0029	0.065 mg/L	0.065	0.09 mg/L	0.09	< 0.20 mg/l
Meo_US_WW_1-120	1	Yes	< 0.0001 mg/L	0.0001	0.00052 mg/L	0.00052	0.00028 mg/L	0.00028	0.0015 mg/L	0.0015	0.082 mg/L	0.082	0.11 mg/L	0.11	< 0.20 mg/l
Meo_US_WW_1-180	1	Yes	< 0.0001 mg/L	0.0001	0.0006 mg/L	0.0006	0.00029 mg/L	0.00029	0.0042 mg/L	0.0042	0.042 mg/L	0.042	0.074 mg/L	0.074	< 0.20 mg/l
Meo_US_WW_1-240	1	Yes	< 0.0001 mg/L	0.0001	0.00046 mg/L	0.00046	0.00033 mg/L	0.00033	0.0022 mg/L	0.0022	0.049 mg/L	0.049	0.062 mg/L	0.062	< 0.20 mg/l
MEO_SW_WW_2_000	1	Yes	0.001 mg/L	0.001	0.0021 mg/L	0.0021	0.00026 mg/L	0.00026	0.0051 mg/L	0.0051	0.092 mg/L	0.092	0.16 mg/L	0.16	< 0.20 mg/l
MEO_SW_WW_2_010	1	Yes	0.00065 mg/L	0.00065	0.0056 mg/L	0.0056	0.00027 mg/L	0.00027	0.019 mg/L	0.019	0.086 mg/L	0.086	0.29 mg/L	0.29	< 0.20 mg/l
MEO_SW_WW_2_020	1	Yes	0.00034 mg/L	0.00034	0.0028 mg/L	0.0028	0.00037 mg/L	0.00037	0.012 mg/L	0.012	0.12 mg/L	0.12	0.29 mg/L	0.29	< 0.20 mg/l
MEO_SW_WW_2_030	1	Yes	0.00031 mg/L	0.00031	0.0012 mg/L	0.0012	0.0003 mg/L	0.0003	0.0054 mg/L	0.0054	0.16 mg/L	0.16	0.27 mg/L	0.27	< 0.20 mg/l
MEO_SW_WW_2_060	1	Yes	0.00027 mg/L	0.00027	0.001 mg/L	0.001	0.00037 mg/L	0.00037	0.0041 mg/L	0.0041	0.12 mg/L	0.12	0.19 mg/L	0.19	< 0.20 mg/l
MEO_SW_WW_2_120	1	Yes	0.00016 mg/L	0.00016	0.0018 mg/L	0.0018	0.00035 mg/L	0.00035	0.015 mg/L	0.015	0.097 mg/L	0.097	0.23 mg/L	0.23	< 0.20 mg/l
MEO_CSO_WW_2_000	1	Yes	0.00058 mg/L	0.00058	0.0074 mg/L	0.0074	0.00083 mg/L	0.00083	0.036 mg/L	0.036	0.035 mg/L	0.035	0.48 mg/L	0.48	< 0.40 mg/l
MEO_CSO_WW_2_010	1	Yes	0.00065 mg/L	0.00065	0.005 mg/L	0.005	0.0011 mg/L	0.0011	0.025 mg/L	0.025	0.026 mg/L	0.026	0.4 mg/L	0.4	< 0.20 mg/l
MEO_CSO_WW_2_020	1	Yes	0.00059 mg/L	0.00059	0.0035 mg/L	0.0035	0.0006 mg/L	0.0006	0.02 mg/L	0.02	0.017 mg/L	0.017	0.28 mg/L	0.28	< 0.40 mg/l
MEO_CSO_WW_2_030	1	Yes	0.00059 mg/L	0.00059	0.0032 mg/L	0.0032	0.00083 mg/L	0.00083	0.017 mg/L	0.017	0.023 mg/L	0.023	0.29 mg/L	0.29	< 0.20 mg/l
MEO_CSO_WW_2_060	1	Yes	0.00052 mg/L	0.00052	0.0015 mg/L	0.0015	0.0012 mg/L	0.0012	0.0073 mg/L	0.0073	0.044 mg/L	0.044	0.18 mg/L	0.18	< 0.40 mg/l
Meo_US_WW_2-000	1	Yes	0.00027 mg/L	0.00027	0.0013 mg/L	0.0013	0.00076 mg/L	0.00076	0.0066 mg/L	0.0066	0.077 mg/L	0.077	0.14 mg/L	0.14	< 0.20 mg/l
Meo_US_WW_2-030	1	Yes	0.00025 mg/L	0.00025	0.00079 mg/L	0.00079	0.00063 mg/L	0.00063	0.004 mg/L	0.004	0.071 mg/L	0.071	0.11 mg/L	0.11	< 0.20 mg/l
Meo_US_WW_2-060	1	Yes	0.00025 mg/L	0.00025	0.00061 mg/L	0.00061	0.00062 mg/L	0.00062	0.0026 mg/L	0.0026	0.089 mg/L	0.089	0.12 mg/L	0.12	< 0.20 mg/l
Meo_US_WW_2-120	1	Yes	0.00029 mg/L	0.00029	0.001 mg/L	0.001	0.00071 mg/L	0.00071	0.0043 mg/L	0.0043	0.12 mg/L	0.12	0.16 mg/L	0.16	< 0.20 mg/l
Meo_US_WW_2-180	1	Yes	0.0002 mg/L	0.0002	0.0026 mg/L	0.0026	0.0003 mg/L	0.0003	0.0083 mg/L	0.0083	0.036 mg/L	0.036	0.088 mg/L	0.088	< 0.20 mg/l
Meo_US_WW_2-240	1	Yes	0.00013 mg/L	0.00013	0.0013 mg/L	0.0013	0.00019 mg/L	0.00019	0.0029 mg/L	0.0029	0.051 mg/L	0.051	0.086 mg/L	0.086	< 0.20 mg/l
Meo_HB_WW_2-000	1	Yes	< 0.001 mg/L	0.001	0.0012 mg/L	0.0012	< 0.001 mg/L	0.001	0.0064 mg/L	0.0064	0.026 mg/L	0.026	0.049 mg/L	0.049	< 0.20 mg/l
Meo_HB_WW_2-030	1	Yes	< 0.001 mg/L	0.001	0.0012 mg/L	0.0012	< 0.001 mg/L	0.001	0.0078 mg/L	0.0078	0.04 mg/L	0.04	0.074 mg/L	0.074	< 0.20 mg/l
Meo_HB_WW_2-060	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0065 mg/L	0.0065	0.031 mg/L	0.031	0.057 mg/L	0.057	< 0.20 mg/l
Meo_HB_WW_2-120	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0078 mg/L	0.0078	0.014 mg/L	0.014	0.031 mg/L	0.031	< 0.20 mg/l
Meo_HB_WW_2-180	1	Yes	< 0.001 mg/L	0.001	0.0042 mg/L	0.0042	< 0.001 mg/L	0.001	0.042 mg/L	0.042	0.023 mg/L	0.023	0.2 mg/L	0.2	< 1.00 mg/l
Meo_HB_WW_2-240	1	Yes	< 0.001 mg/L	0.001	0.0065 mg/L	0.0065	< 0.001 mg/L	0.001	0.063 mg/L	0.063	0.019 mg/L	0.019	0.21 mg/L	0.21	< 0.40 mg/l
MEO_DS_WW_2_000	1	Yes	0.00012 mg/L	0.00012	0.00025 mg/L	0.00025	< 0.0001 mg/L	0.0001	0.00052 mg/L	0.00052	0.0077 mg/L	0.0077	0.011 mg/L	0.011	< 0.20 mg/l
MEO_DS_WW_2_030	1	Yes	0.00019 mg/L	0.00019	0.00038 mg/L	0.00038	< 0.0001 mg/L	0.0001	0.0009 mg/L	0.0009	0.0078 mg/L	0.0078	0.012 mg/L	0.012	< 0.20 mg/l
MEO_DS_WW_2_060	1	Yes	0.00015 mg/L	0.00015	0.0004 mg/L	0.0004	< 0.0001 mg/L	0.0001	0.0016 mg/L	0.0016	0.011 mg/L	0.011	0.017 mg/L	0.017	< 0.20 mg/l
MEO_DS_WW_2_120	1	Yes	0.00041 mg/L	0.00041	0.00098 mg/L	0.00098	0.0004 mg/L	0.0004	0.0053 mg/L	0.0053	0.048 mg/L	0.048	0.089 mg/L	0.089	< 0.20 mg/l
MEO_DS_WW_2_180	1	Yes	0.00036 mg/L	0.00036	0.0012 mg/L	0.0012	0.00017 mg/L	0.00017	0.0065 mg/L	0.0065	0.026 mg/L	0.026	0.068 mg/L	0.068	< 0.20 mg/l
MEO_DS_WW_2_240	1	Yes	0.00027 mg/L	0.00027	0.0049 mg/L	0.0049	0.0003 mg/L	0.0003	0.038 mg/L	0.038	0.022 mg/L	0.022	0.23 mg/L	0.23	< 0.40 mg/l
PtChev1_WW_2-A	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0046 mg/L	0.0046	< 0.01 mg/L	0.01	0.016 mg/L	0.016	< 0.20 mg/l
PtChev1_WW_2-B	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0017 mg/L	0.0017	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev1_WW_2-C	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev1_WW_2-D	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev1_WW_2-E	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev1_WW_2-F	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_2-A	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0016 mg/L	0.0016	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_2-B	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_2-C	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_2-D	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_2-E	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev2_WW_2-F	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0021 mg/L	0.0021	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_2-A	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.002 mg/L	0.002	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_2-B	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_2-C	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_2-D	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev3_WW_2-E	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.24 mg/l
PtChev3_WW_2-F	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_2-A	1	Yes	< 0.001 mg/L	0.001	0.0018 mg/L	0.0018	< 0.001 mg/L	0.001	0.021 mg/L	0.021	< 0.01 mg/L	0.01	0.07 mg/L	0.07	< 0.20 mg/l
PtChev4_WW_2-B	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.002 mg/L	0.002	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_2-C	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	0.0033 mg/L	0.0033	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_2-D	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_2-E	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l
PtChev4_WW_2-F	1	Yes	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.001 mg/L	0.001	< 0.00099 mg/L	0.00099	< 0.01 mg/L	0.01	< 0.0099 mg/L	0.0099	< 0.20 mg/l

Sample Name	Decimal Result * refer note TPH Band C7-C9 mg/l	Test Result TPH Band C10-C14	Decimal Result * refer note TPH Band C10-C14 mg/l	Test Result TPH Band C15-C36	Decimal Result * refer note TPH Band C15-C36 mg/l	Test Result Acenaphthylene	Decimal Result * refer note Acenaphthylene mg/L	Test Result Acenaphthene	Decimal Result * refer note Acenaphthene mg/L	Test Result Anthracene	Decimal Result * refer note Anthracene mg/L	Test Result Benzo(a)anthracene	Decimal Result * refer note Benzo(a)anthracene mg/L	Test Result Benzo(a)pyrene	Decimal Result * refer note Benzo(a)pyrene mg/L
MEO_DS_Base_20101129	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_HB_Base_20101129	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_MID_Base_20101129	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_US_Base_20101129	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev_1_Base_20101129	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev_2_Base_20101129	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev_3_Base_20101129	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev_4_Base_20101129	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_Base_20101201															
Meo_SS 2010121	0.25	< 0.25 mg/l	0.25	< 0.25 mg/l	0.25	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev_4_Base_20101224	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
PtChev_3_Base_20101224	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
MEO_HB_Base_20101224	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
MEO_MID_Base_20101224	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
MEO_DS_Base_20101224	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
MEO_US_Base_20101224	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
PtChev_1_Base_20101224	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
PtChev_2_Base_20101224	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
Meo_OF_Base_20101224	0.25	0.29 mg/l	0.29	2.36 mg/l	2.36	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	0.00026 mg/L	0.00026	0.00003 mg/L	0.00003
PtChev_1_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev_2_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev_3_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev_4_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_MID_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_US_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_HB_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_OF_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_OF_RCT_Base_20110127	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00030 mg/L	0.0003	< 0.00010 mg/L	0.0001
MEO_SW_WW_1_000	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00178 mg/L	0.00178	0.00028 mg/L	0.00028
MEO_SW_WW_1_010	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00290 mg/L	0.0029	0.00040 mg/L	0.0004
MEO_SW_WW_1_020	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_SW_WW_1_030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_SW_WW_1_060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00157 mg/L	0.001568	0.00061 mg/L	0.000612
MEO_SW_WW_1_120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_CSO_WW_1_000	0.2	< 0.20 mg/l	0.2	0.81 mg/l	0.81	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_CSO_WW_1_010	0.2	< 0.20 mg/l	0.2	0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_CSO_WW_1_020	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00027 mg/L	0.000267	< 0.00010 mg/L	0.0001
MEO_CSO_WW_1_030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00026 mg/L	0.000258	< 0.00010 mg/L	0.0001
MEO_CSO_WW_1_060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00065 mg/L	0.000653	< 0.00010 mg/L	0.0001
MEO_CSO_WW_1_120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev2_WW_1-A	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	0.00015 mg/L	0.000147
PtChev2_WW_1-B	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev2_WW_1-C	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00024 mg/L	0.000236	< 0.00010 mg/L	0.0001
PtChev2_WW_1-D	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev2_WW_1-E	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev2_WW_1-F	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev3_WW_1-A	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev3_WW_1-B	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev3_WW_1-C	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev3_WW_1-D	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev3_WW_1-E	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev3_WW_1-F	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev4_WW_1-A	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev4_WW_1-B	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev4_WW_1-C	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev4_WW_1-D	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev4_WW_1-E	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev4_WW_1-F	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_HB_WW_1-000	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_HB_WW_1-030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_HB_WW_1-060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_HB_WW_1-120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_HB_WW_1-180	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_HB_WW_1-240	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev1_WW_1-A	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev1_WW_1-B	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev1_WW_1-C	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev1_WW_1-D	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev1_WW_1-E	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
PtChev1_WW_1-F	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_WW_1_000	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_WW_1_030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_WW_1_060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_WW_1_120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_WW_1_180	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_WW_1_240	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_US_WW_1-000	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00033 mg/L	0.000325	0.00038 mg/L	0.000379
Meo_US_WW_1-030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_US_WW_1-060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_US_WW_1-120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_US_WW_1-180	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_US_WW_1-240	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_SW_WW_2_000	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005
MEO_SW_WW_2_010	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005
MEO_SW_WW_2_020	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005
MEO_SW_WW_2_030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005
MEO_SW_WW_2_060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005
MEO_SW_WW_2_120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005
MEO_CSO_WW_2_000	0.4	< 0.40 mg/l	0.4	1.20 mg/l	1.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_CSO_WW_2_010	0.2	< 0.20 mg/l	0.2	0.56 mg/l	0.56	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_CSO_WW_2_020	0.4	< 0.40 mg/l	0.4	1.96 mg/l	1.96	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_CSO_WW_2_030	0.2	< 0.20 mg/l	0.2	0.57 mg/l	0.57	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_CSO_WW_2_060	0.4	< 0.40 mg/l	0.4	1.18 mg/l	1.18	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_US_WW_2-000	0.2	< 0.20 mg/l	0.2	1.14 mg/l	1.14	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_US_WW_2-030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_US_WW_2-060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_US_WW_2-120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_US_WW_2-180	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_US_WW_2-240	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-000	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-180	1	< 1.00 mg/l	1	< 1.00 mg/l	1	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00010 mg/L	0.0001	0.00020 mg/L	0.0002
Meo_HB_WW_2-240	0.4	< 0.40 mg/l	0.4	< 0.40 mg/l	0.4	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_000	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_030	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_060	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_120	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_180	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_240	0.4	< 0.40 mg/l	0.4	< 0.40 mg/l	0.4	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-A	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-B	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-C	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-D	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002
PtChev1_WW_2-E	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-F	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-A	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-B	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-C	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-D	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-E	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-F	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-A	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-B	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-C	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-D	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-E	0.24	< 0.24 mg/l	0.24	< 0.24 mg/l	0.24	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-F	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-A	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-B	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-C	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-D	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-E	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-F	0.2	< 0.20 mg/l	0.2	< 0.20 mg/l	0.2	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001

Sample Name	Test Result Benzo(b)fluoranthene	Decimal Result * refer note Benzo(b)fluoranthene mg/L	Test Result Benzo(ghi)perylene	Decimal Result * refer note Benzo(ghi)perylene mg/L	Test Result Benzo(k)fluoranthene	Decimal Result * refer note Benzo(k)fluoranthene mg/L	Test Result Chrysene	Decimal Result * refer note Chrysene mg/L	Test Result Dibenzo(ah)anthracene	Decimal Result * refer note Dibenzo(ah)anthracene mg/L	Test Result Fluoranthene	Decimal Result * refer note Fluoranthene mg/L	Test Result Fluorene	Decimal Result * refer note Fluorene mg/L
MEO_DS_Base_20101129	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_HB_Base_20101129	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_MID_Base_20101129	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_US_Base_20101129	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev_1_Base_20101129	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev_2_Base_20101129	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev_3_Base_20101129	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev_4_Base_20101129	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_DS_Base_20101201														
Meo_SS 2010121	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev_4_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
PtChev_3_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
MEO_HB_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
MEO_MID_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
MEO_DS_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
MEO_US_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
PtChev_1_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
PtChev_2_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
Meo_OF_Base_20101224	0.00002 mg/L	0.00002	0.00001 mg/L	0.00001	0.00003 mg/L	0.00003	0.00008 mg/L	0.00008	0.00006 mg/L	0.00006	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001
PtChev_1_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev_2_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev_3_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev_4_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_MID_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_US_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_HB_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_DS_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_OF_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_OF_RCT_Base_20110127	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_SW_WW_1_000	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	0.00116 mg/L	0.00116	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_SW_WW_1_010	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	0.00180 mg/L	0.0018	< 0.00010 mg/L	0.0001	0.00054 mg/L	0.00054	< 0.00020 mg/L	0.0002
MEO_SW_WW_1_020	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_SW_WW_1_030	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_SW_WW_1_060	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	0.00065 mg/L	0.000645	< 0.00020 mg/L	0.0002
MEO_SW_WW_1_120	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_1_000	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_1_010	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_1_020	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_1_030	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_1_060	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	0.00035 mg/L	0.000354	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_1_120	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev2_WW_1-A	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev2_WW_1-B	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev2_WW_1-C	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev2_WW_1-D	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev2_WW_1-E	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev2_WW_1-F	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev3_WW_1-A	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev3_WW_1-B	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev3_WW_1-C	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev3_WW_1-D	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev3_WW_1-E	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev3_WW_1-F	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev4_WW_1-A	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev4_WW_1-B	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev4_WW_1-C	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev4_WW_1-D	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev4_WW_1-E	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev4_WW_1-F	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_HB_WW_1-000	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_HB_WW_1-030	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_HB_WW_1-060	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_HB_WW_1-120	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_HB_WW_1-180	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_HB_WW_1-240	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev1_WW_1-A	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev1_WW_1-B	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev1_WW_1-C	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev1_WW_1-D	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev1_WW_1-E	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
PtChev1_WW_1-F	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_DS_WW_1_000	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_DS_WW_1_030	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_DS_WW_1_060	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_DS_WW_1_120	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_DS_WW_1_180	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_DS_WW_1_240	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_US_WW_1-000	0.00027 mg/L	0.000265	0.00013 mg/L	0.00013	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	0.00035 mg/L	0.000345	0.00034 mg/L	0.000341	< 0.00020 mg/L	0.0002
Meo_US_WW_1-030	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_US_WW_1-060	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_US_WW_1-120	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_US_WW_1-180	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_US_WW_1-240	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_SW_WW_2_000	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001
MEO_SW_WW_2_010	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	0.00023 mg/L	0.00023	< 0.00010 mg/L	0.0001
MEO_SW_WW_2_020	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001
MEO_SW_WW_2_030	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001
MEO_SW_WW_2_060	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001
MEO_SW_WW_2_120	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00005 mg/L	0.00005	< 0.00015 mg/L	0.00015	< 0.00010 mg/L	0.0001
MEO_CSO_WW_2_000	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_2_010	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_2_020	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_2_030	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
MEO_CSO_WW_2_060	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_US_WW_2-000	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_US_WW_2-030	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001	< 0.00030 mg/L	0.0003	< 0.00020 mg/L	0.0002
Meo_US_WW_2-060	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_US_WW_2-120	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_US_WW_2-180	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00010 mg/L	0.0001	0.00010 mg/L	0.0001
Meo_US_WW_2-240	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-000	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-030	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-060	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-120	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-180	0.00020 mg/L	0.0002	0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
Meo_HB_WW_2-240	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00020 mg/L	0.0002	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_000	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_030	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_060	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_120	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_180	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
MEO_DS_WW_2_240	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-A	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-B	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-C	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-D	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002
PtChev1_WW_2-E	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev1_WW_2-F	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-A	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-B	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-C	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-D	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-E	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev2_WW_2-F	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-A	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-B	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-C	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-D	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-E	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev3_WW_2-F	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-A	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-B	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-C	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-D	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-E	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001
PtChev4_WW_2-F	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001

Sample Name	Test Result Indeno(1,2,3,c,d)pyrene	Decimal Result * refer note Indeno(1,2,3,c,d)pyrene mg/L	Test Result Naphthalene	Decimal Result * refer note Naphthalene mg/L	Test Result Phenanthrene	Decimal Result * refer note Phenanthrene mg/L	Test Result Pyrene	Decimal Result * refer note Pyrene mg/L	Test Result Total petroleum hydrocarbons (C7-C36) liquids trace profile	Decimal Result * refer note Total petroleum hydrocarbons (C7-C36) liquids trace profile mg/L	Test Result Volatile matter liquids	Decimal Result * refer note Volatile matter liquids mg/L
MEO_DS_Base_20101129	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
MEO_HB_Base_20101129	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
MEO_MID_Base_20101129	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
MEO_US_Base_20101129	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
PtChev_1_Base_20101129	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
PtChev_2_Base_20101129	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
PtChev_3_Base_20101129	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
PtChev_4_Base_20101129	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
MEO_DS_Base_20101201												
Meo_SS 2010121	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.38 mg/L	0.38		
PtChev_4_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.30 mg/L	0.3		
PtChev_3_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.30 mg/L	0.3		
MEO_HB_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.30 mg/L	0.3		
MEO_MID_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.30 mg/L	0.3		
MEO_DS_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.30 mg/L	0.3		
MEO_US_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.30 mg/L	0.3		
PtChev_1_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.30 mg/L	0.3		
PtChev_2_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.30 mg/L	0.3		
Meo_OF_Base_20101224	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	< 0.00001 mg/L	0.00001	0.00002 mg/L	0.00002	2.65 mg/L	2.65	156 mg/L	155.5
PtChev_1_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
PtChev_2_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
PtChev_3_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
PtChev_4_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
MEO_MID_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
MEO_US_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
MEO_HB_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
MEO_DS_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3		
Meo_OF_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	61 mg/L	60.8
Meo_OF_RCT_Base_20110127	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	89 mg/L	89.2
MEO_SW_WW_1_000	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	0.00022 mg/L	0.00022	< 0.30 mg/L	0.3	17 mg/L	16.8
MEO_SW_WW_1_010	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	16 mg/L	16.2
MEO_SW_WW_1_020	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	12 mg/L	12.4
MEO_SW_WW_1_030	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	12 mg/L	12.4
MEO_SW_WW_1_060	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	0.00069 mg/L	0.000693	< 0.30 mg/L	0.3	10 mg/L	10
MEO_SW_WW_1_120	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	7 mg/L	7
MEO_CSO_WW_1_000	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	0.81 mg/L	0.81	98 mg/L	98.33333333
MEO_CSO_WW_1_010	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	76 mg/L	76
MEO_CSO_WW_1_020	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	0.00027 mg/L	0.000274	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	67 mg/L	66.66666667
MEO_CSO_WW_1_030	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	54 mg/L	54
MEO_CSO_WW_1_060	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	49 mg/L	48.66666667
MEO_CSO_WW_1_120	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	45 mg/L	45.33333333
PtChev2_WW_1-A	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	10
PtChev2_WW_1-B	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	14 mg/L	13.6
PtChev2_WW_1-C	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	9.6
PtChev2_WW_1-D	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	11 mg/L	11.4
PtChev2_WW_1-E	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	10
PtChev2_WW_1-F	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	9.2
PtChev3_WW_1-A	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	8.875
PtChev3_WW_1-B	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	9
PtChev3_WW_1-C	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	8 mg/L	7.8
PtChev3_WW_1-D	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	11 mg/L	10.6
PtChev3_WW_1-E	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	7 mg/L	7
PtChev3_WW_1-F	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	8.6
PtChev4_WW_1-A	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	11 mg/L	10.8
PtChev4_WW_1-B	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	13 mg/L	12.8
PtChev4_WW_1-C	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	9.6
PtChev4_WW_1-D	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	9.4
PtChev4_WW_1-E	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	12 mg/L	11.8
PtChev4_WW_1-F	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	9
Meo_HB_WW_1-000	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	9
Meo_HB_WW_1-030	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	10
Meo_HB_WW_1-060	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	11 mg/L	11.2
Meo_HB_WW_1-120	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	19 mg/L	19
Meo_HB_WW_1-180	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	41 mg/L	41.33333333
Meo_HB_WW_1-240	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	31 mg/L	31.33333333
PtChev1_WW_1-A	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	9.6
PtChev1_WW_1-B	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	18 mg/L	17.8
PtChev1_WW_1-C	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	17 mg/L	16.6
PtChev1_WW_1-D	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	9.6
PtChev1_WW_1-E	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	10
PtChev1_WW_1-F	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	9
MEO_DS_WW_1_000	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	5 mg/L	4.8
MEO_DS_WW_1_030	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	6 mg/L	5.6
MEO_DS_WW_1_060	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	8 mg/L	7.6
MEO_DS_WW_1_120	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	13 mg/L	13.4
MEO_DS_WW_1_180	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	13 mg/L	13.4
MEO_DS_WW_1_240	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	43 mg/L	43
Meo_US_WW_1-000	0.00050 mg/L	0.000502	< 0.0005 mg/L	0.0005	0.00020 mg/L	0.000201	0.00021 mg/L	0.000208	< 0.30 mg/L	0.3	54 mg/L	54
Meo_US_WW_1-030	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	15 mg/L	15
Meo_US_WW_1-060	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	12 mg/L	12.4
Meo_US_WW_1-120	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	10 mg/L	10
Meo_US_WW_1-180	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	12 mg/L	11.8
Meo_US_WW_1-240	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	17 mg/L	17.2
MEO_SW_WW_2_000	< 0.00005 mg/L	0.00005	< 0.00025 mg/L	0.00025	< 0.00010 mg/L	0.0001	0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	82 mg/L	81.5
MEO_SW_WW_2_010	< 0.00005 mg/L	0.00005	< 0.00025 mg/L	0.00025	< 0.00010 mg/L	0.0001	0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	49 mg/L	49
MEO_SW_WW_2_020	< 0.00005 mg/L	0.00005	< 0.00025 mg/L	0.00025	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	36 mg/L	36
MEO_SW_WW_2_030	< 0.00005 mg/L	0.00005	< 0.00025 mg/L	0.00025	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	19 mg/L	19.2
MEO_SW_WW_2_060	< 0.00005 mg/L	0.00005	< 0.00025 mg/L	0.00025	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	12 mg/L	12
MEO_SW_WW_2_120	< 0.00005 mg/L	0.00005	< 0.00025 mg/L	0.00025	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	23 mg/L	23.2
MEO_CSO_WW_2_000	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	1.20 mg/L	1.2	225 mg/L	225
MEO_CSO_WW_2_010	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	0.00010 mg/L	0.0001	0.00010 mg/L	0.0001	0.56 mg/L	0.56	179 mg/L	179
MEO_CSO_WW_2_020	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	1.96 mg/L	1.96	142 mg/L	141.5
MEO_CSO_WW_2_030	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	0.57 mg/L	0.57	132 mg/L	131.5
MEO_CSO_WW_2_060	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	1.18 mg/L	1.18	73 mg/L	73
Meo_US_WW_2-000	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	1.14 mg/L	1.14	26 mg/L	25.6
Meo_US_WW_2-030	< 0.00010 mg/L	0.0001	< 0.0005 mg/L	0.0005	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	13 mg/L	12.8
Meo_US_WW_2-060	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	13 mg/L	12.8
Meo_US_WW_2-120	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	13 mg/L	12.6
Meo_US_WW_2-180	0.00010 mg/L	0.0001	0.0001 mg/L	0.0001	0.00010 mg/L	0.0001	0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	27 mg/L	27.4
Meo_US_WW_2-240	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	0.00010 mg/L	0.0001	0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	14 mg/L	14
Meo_HB_WW_2-000	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	16 mg/L	15.6
Meo_HB_WW_2-030	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	18 mg/L	17.6
Meo_HB_WW_2-060	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	16 mg/L	15.6
Meo_HB_WW_2-120	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	15 mg/L	15.4
Meo_HB_WW_2-180	0.00010 mg/L	0.0001	0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00030 mg/L	0.0003	< 1.50 mg/L	1.5	63 mg/L	63.33333333
Meo_HB_WW_2-240	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	0.00020 mg/L	0.0002	< 0.60 mg/L	0.6	85 mg/L	84.5
MEO_DS_WW_2_000	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	2 mg/L	2
MEO_DS_WW_2_030	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	3 mg/L	2.666666667
MEO_DS_WW_2_060	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	3 mg/L	2.833333333
MEO_DS_WW_2_120	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	14 mg/L	14
MEO_DS_WW_2_180	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	13 mg/L	13.33333333
MEO_DS_WW_2_240	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.60 mg/L	0.6	71 mg/L	71
PtChev1_WW_2-A	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	16 mg/L	16.4
PtChev1_WW_2-B	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	16 mg/L	16.2
PtChev1_WW_2-C	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	10 mg/L	9.8
PtChev1_WW_2-D	< 0.00020 mg/L	0.0002	< 0.0002 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.00020 mg/L	0.0002	< 0.30 mg/L	0.3	9 mg/L	9.4
PtChev1_WW_2-E	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	7 mg/L	7.4
PtChev1_WW_2-F	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	8 mg/L	8.4
PtChev2_WW_2-A	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	13 mg/L	12.6
PtChev2_WW_2-B	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	15 mg/L	15.2
PtChev2_WW_2-C	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	10 mg/L	10.2
PtChev2_WW_2-D	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	11 mg/L	11
PtChev2_WW_2-E	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	9 mg/L	8.6
PtChev2_WW_2-F	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	9 mg/L	9.2
PtChev3_WW_2-A	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	24 mg/L	24.33333333
PtChev3_WW_2-B	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	13 mg/L	13
PtChev3_WW_2-C	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	13 mg/L	13
PtChev3_WW_2-D	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	8 mg/L	7.8
PtChev3_WW_2-E	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.37 mg/L	0.37	7 mg/L	7.4
PtChev3_WW_2-F	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	8 mg/L	7.6
PtChev4_WW_2-A	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	70 mg/L	69.5
PtChev4_WW_2-B	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	22 mg/L	21.8
PtChev4_WW_2-C	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	13 mg/L	13
PtChev4_WW_2-D	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	13 mg/L	12.6
PtChev4_WW_2-E	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	8 mg/L	8.4
PtChev4_WW_2-F	< 0.00010 mg/L	0.0001	< 0.0001 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.00010 mg/L	0.0001	< 0.30 mg/L	0.3	6 mg/L	5.8

Appendix D: Biofilm Report

Preliminary report aim:

Assessment of bacterial community profiles from upstream and downstream sites of Meola Creek

Authors:

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Dr Vidya Washington, Centre for Microbial Innovation, University of Auckland

Introduction:

A: Bacterial Community Profile (BCP)

Recent research at the University of Auckland has revealed that bacterial communities in biofilms possess many of the same traits as macroinvertebrates and therefore offer the potential to be used as indicators of stream health. The project has recently been extended nationally with 256 sites studied from across the country and including many urban sites.

The bacterial community profiles in urban streams are typically quite complex and highly diverse, as compared to macrobenthic invertebrate communities which are typically depauperate in urban streams. The BCP for a site provides an ecosystem based tool for direct comparison between, and within sites over time.

B: Bacterial Community Index (BCI)

The work in Auckland and across New Zealand has led to the development of a bacterial community index (BCI) which allows the scoring of stream health (ARC 2009). The BCI provides a metric, in the manner of the MCI, for assessing stream health which has national relevance and interpretability. The BCI can be included in a “multi-metric” system of assessing stream health. Such systems exist for macroinvertebrates and fish communities, and the BCI offers such a system for a biological indicator at a lower trophic level. The BCI provides insight into the critical base-level energy, carbon and nutrient cycling attributes of the stream ecosystem.

The range of the index is not a gradient of ‘poor’ to ‘high’ quality community and function, rather an indication of the dominance in types of communities and function present. All streams are likely to have a high microbial diversity but streams with low BCI will imply a range of bacterial species and strains associated with levels of contamination or impact while those with high BCI will more strongly reflect microbial communities likely to occur in low-impact streams.

The use of a bacterial indicator is potentially advantageous for a number of reasons, including:

- That responses to environmental stressors can often be observed first at lower trophic levels.
- Greater discrimination at poor quality sites (e.g. urban streams) than invertebrate or fish indicators.
- It is not designed to respond to only organic pollution (as the MCI).
- That small sample size allows many replicates from sample sites.
- That sample collection creates minimal site disturbance, which allows repeated sampling at sites with no recovery periods required.
- That samples can be collected from sites where other indicators (invertebrates or fish) are not present.
- Quick turnaround times.

C: Rationale to calculate the BCI

Bacterial community profile data from the Meola upstream and downstream sites is reformatted and applied to a proprietary model developed as part of a Regional Council funded project, the bacterial community index (BCI) developed in November 2010. The model output provides a BCI statistic and this is interpreted with reference to the national database of (currently) 1125 samples.

Summary of methods:

Detailed methodology is in the Appendix at the end of this report. The bacterial diversity of biofilm communities, including the unculturable component, was assessed using Automated Ribosomal Intergenic Spacer Analysis (ARISA). This method analyzes the genetic information contained in nucleic acids directly extracted from environmental samples and enables sensitive descriptions of community diversity and composition to be attained. This PCR-based method exploits the variability in the length of the 16S-23S intergenic spacer (IGS) region of bacteria, and creates ‘fingerprints’ of microbial communities based on the length of the amplified nucleotide sequences. For each sample, these ‘fingerprints’ were analysed to obtain the bacterial community profiles (BCP) using the profiles from 150-1000 bp, and finally, to derive the bacterial community index (BCI). Similarities / differences in BCPs were investigated using multidimensional scaling (MDS) and permutational analysis of variance (PERMANOVA) methods.

Findings:

A: Bacterial Community Profiles (BCPs)

The BCPs obtained from the sampling of Meola Creek (downstream and upstream sites, November 2010, and January 2011) are as provided in Figure 1. A total of 5 sample replicates were collected for each site, and used for BCP and BCI calculations. The BCP for each sample indicates that the stream biofilm bacterial community is complex and comprised of peaks, diverse in size (length shown on the x-axis in nucleotide base pairs) and abundance (y axis – fluorescent intensity). In general, the upstream and downstream profiles appear different and this is explained more fully using multidimensional scaling (MDS) methods.

B: Bacterial community index (BCI)

The BCI for the Meola (upstream and downstream samples) for biofilms sampled in November 2010 and January 2011 were calculated. Samples were collected in October 2010 for methodology testing, and data for these was available. Therefore these were included for comparison although they fall outside the study. The assessment was based on previously established predictive models using 254 stream sites from 7 Regional Councils of New Zealand (of these, 65 were from Auckland). The total range of the BCI across NZ is on a scale of 6 – 14, with a mean value of approximately 10. The BCI for Meola sites is shown in Table 1. To contextualize the Meola samples, other Auckland sites (ARC data) including 3 streams each from the lower, intermediate and high-end of the BCI scale were added. Results (table 1) reveal that the Meola sites show a mid-range quality and BCI values from the January 2011 were slightly higher than those in November 2010.

Table1: Bacterial community index (BCI) measures of the downstream and upstream Meola sites at two time points, November 2010 and January 2011. Data was also available from samples collected for methodology evaluation in October 2010 and were included for comparison. To enable comparison, BCI values of other previously studied sites are included. Of the range (6-14), 3 sites each from the lower, higher and intermediate (mean -10) ranges are shown.

Site name	Code	BCI
Meola Upstream (Nov 2010)	Meola U/s (Nov 2010)	8.99
Meola Downstream (Nov 2010)	Meola D/s (Nov 2010)	9.17
Meola Upstream (Jan 2011)	Meola U/s (Jan 2011)	10.06
Meola Downstream (Jan 2011)	Meola D/s (Jan 2011)	10.76
Meola Upstream Oct 2010 (trial)	Meola U/s (Oct 2010)	9.71
Meola downstream Oct 2010 (trial)	Meola D/s (Oct 2010)	10.01
Puhinui LTB	PHN	6.18
Papakura	PP	6.44
Otara	OTR	6.49
Okura Reserve	OR	10.11
Shakespear	SH	10.19
Nukumea	NKU	10.39
Mangatawhiri	MTW	13.74
Konini	KN	13.96
Marawhara	MW	14.27

C: Statistical analyses of bacterial community profile data

For bacterial community analyses, 4 sets of biofilm samples were collected from Meola Creek, 2 sets each (upstream and downstream) in November 2010 and January 2011. For statistical reliability, each set consisted of 5 replicate biofilm samples.

Multidimensional scaling (MDS) was done to visualise multivariate patterns in bacterial community structure based on the BCP generated from each biofilm sample (Figures 2 and 3). The MDS plot (Figure 2) was generated using the Meola Creek samples from all the time points (October and November 2010, and January 2011). This plot shows good separation between all sample sets, and within each set, replicates showed a high degree of clustering.

To understand the statistical significance of differences between sample sets, a permutational multivariate analysis of variance (PERMANOVA) was carried out, p values <0.05 are considered significant. Results (Table 2) show significant differences in BCPs based on location (upstream or downstream) and sampling times.

Table 2: Results of permutational analysis of variance (PERMANOVA) of bacterial community profile data. Group of samples were compared based on sampling location (upstream - us / downstream - ds) and sampling times (Nov 2010 and January 2011) and 'P value' indicates the statistical significance of comparisons (p<0.05 indicates significant differences). Results indicate significant differences based on sampling location and time.

Groups compared	P value
Location (upstream and downstream)	0.001
Sampling time (Nov 2010 and Jan 2011)	0.001

To understand how these two factors contributed to the variation in BCPs, a 2-factor PERMANOVA was carried out on the basis of the Bray-Curtis statistic showing the partitioning of the multivariate variation for the factors 'location (upstream / downstream)' and 'Sampling time (Nov 2010 / Jan 2011)'. This test calculated 'P' values using 999 permutations of variables under a reduced model. Results (Table 3) revealed that the differences in the 4 Meola sample sets were slightly more affected by time than by location (upstream / downstream).

Table 3: A permutational analysis of variance (PERMANOVA) of bacterial community profile (BCP) data obtained on the basis of the Bray-Curtis statistic showing the partitioning of multivariate variation and tests for the factors of 'location' and 'Time'. 'P' values were obtained using 999 permutations of variables under a reduced model, and the square root values suggest that differences in BCPs were slightly more affected by time than by location.

Source of variation	df	SS	Pseudo-F	P value	Square root values
Location (upstream / downstream)	1	10584	4.8507	0.001	28.99
Sampling time (Non2010 / Jan 2011)	1	11648	5.3383	0.001	30.77

D: Meola Creek samples within Regional context

Similarities / differences in bacterial community profiles of the Meola Creek samples in context with previously studied reference Auckland sites are represented in an MDS plot (Figure 3).

This plot shows a strong separation of the Meola sites from the reference Auckland sites. Within the Auckland sites, the high-impact BCI sites (PHN, PP, OTR) appear well-separated from the mid-range-impact BCI sites (OR, SH and NKU), and to a greater degree from the low-impact sites (MTW, KN and MW). Within the Meola sites, BCPs appear to be different between the upstream and downstream sites.

To understand the similarities / differences between the Meola Creek sites and the reference Auckland sites, a permutational analysis of variance (PERMANOVA) was carried out (p values < 0.05 are considered significant). Results (Table 4) showed significant differences between the Meola group of samples and whole group of reference Auckland sites. The Meola group of samples were also significantly different from the individual groups of low, mid-range and high BCI reference Auckland sites.

Table 4: Results of permutational analysis of variance (PERMANOVA) of bacterial community profile data. Groups of samples were compared based on the site they belonged to (Meola group of samples / whole group of reference Auckland site). Meola group of sites were also compared to the individual groups of low, mid-range and high BCI sites, 'P value' indicates the statistical significance of comparisons (p<0.05 indicates significant differences). Results indicate the Meola group of samples were significantly different from the entire group of reference Auckland sites, and from the individual groups of low, mid-range and high BCI reference Auckland sites.

Groups compared	**P value**
Meola group of samples vs whole group of Auckland reference sites	0.001
Meola group of samples vs low BCI Auckland reference sites	0.001
Meola group of samples vs mid-rangelow BCI Auckland reference sites	0.001
Meola group of samples vs high BCI Auckland reference sites	0.001

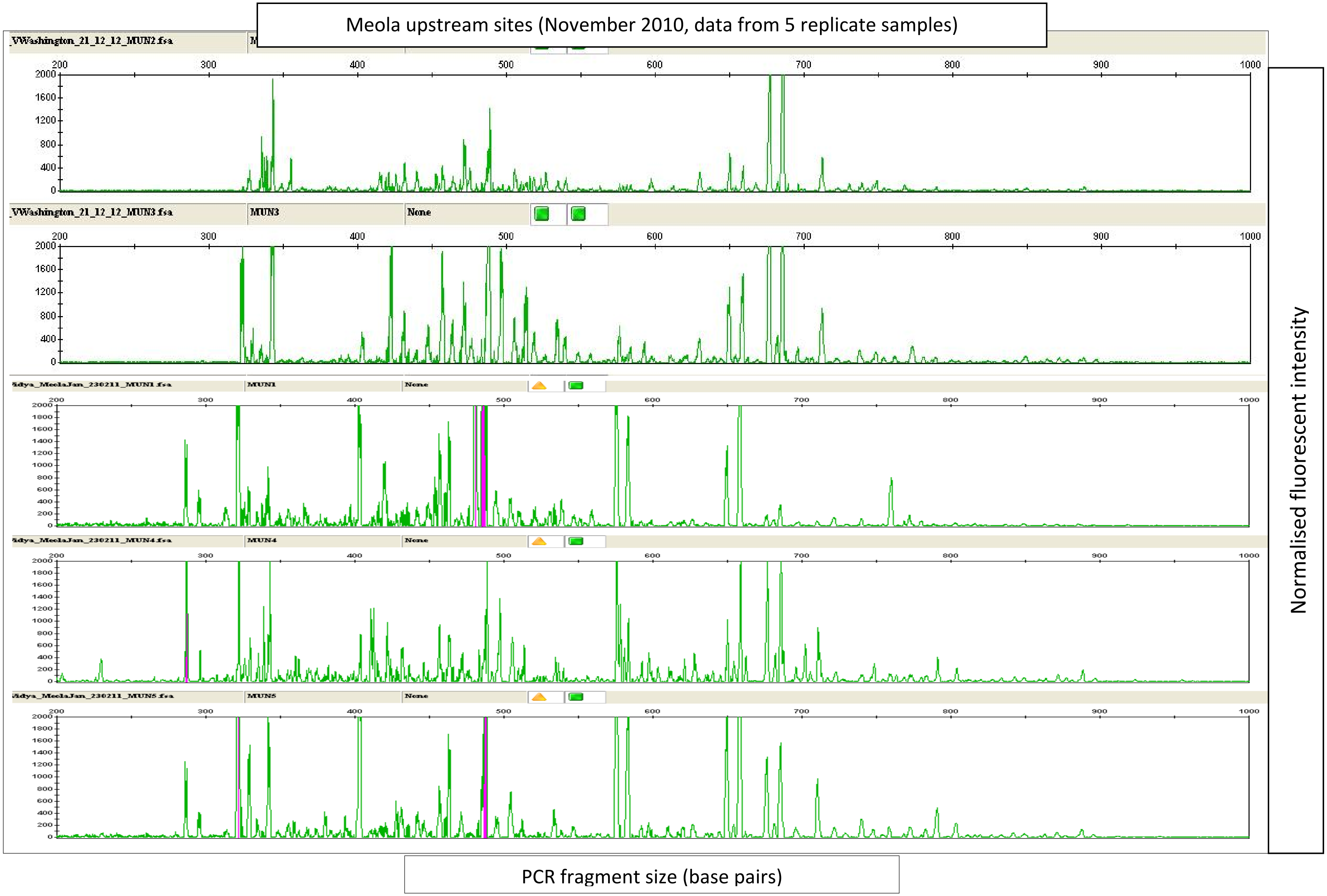


Figure 1: Bacterial community profiles (BCPs) of biofilms sampled from Meola Creek (upstream, Nov 2010). Biofilms were sampled using sponges, brought to the lab, macerated, subjected to DNA extraction and the 16S-23S intergenic spacer region of the whole biofilm community amplified. Data are normalised peak lengths of the 16S-23S intergenic regions of the bacterial genome (x-axis; in nucleotide base pairs) within the total community, and normalised fluorescent intensity as recorded by a GeneScan automated DNA fragment analyser (y axis). This method creates a 'fingerprint' of the structure of environmental bacterial communities and peak height represents the relative abundance of each taxon within the total community.

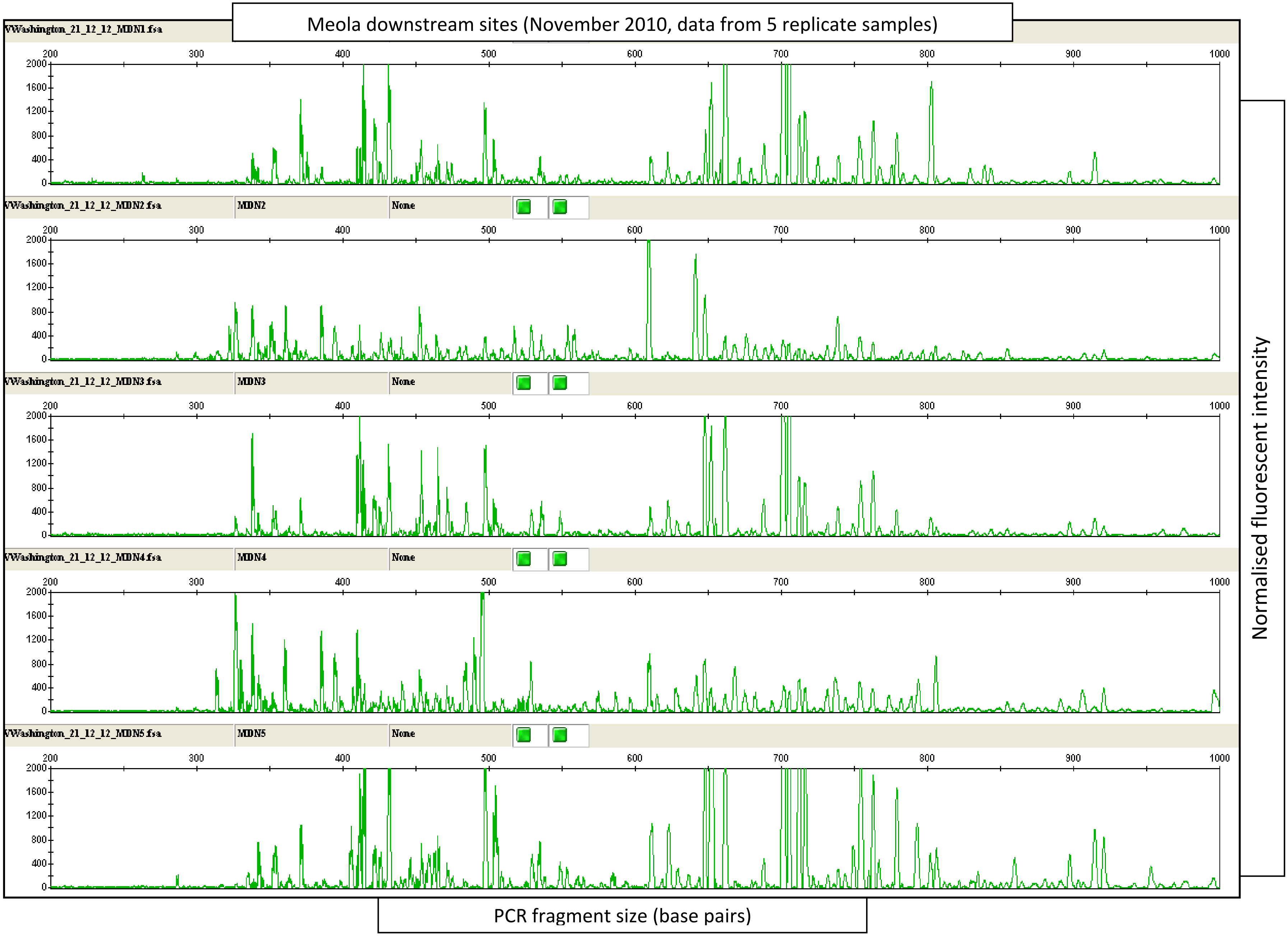


Figure 1 (contd): Bacterial community profiles (BCPs) of biofilms sampled from Meola Creek (downstream, Nov 2010).

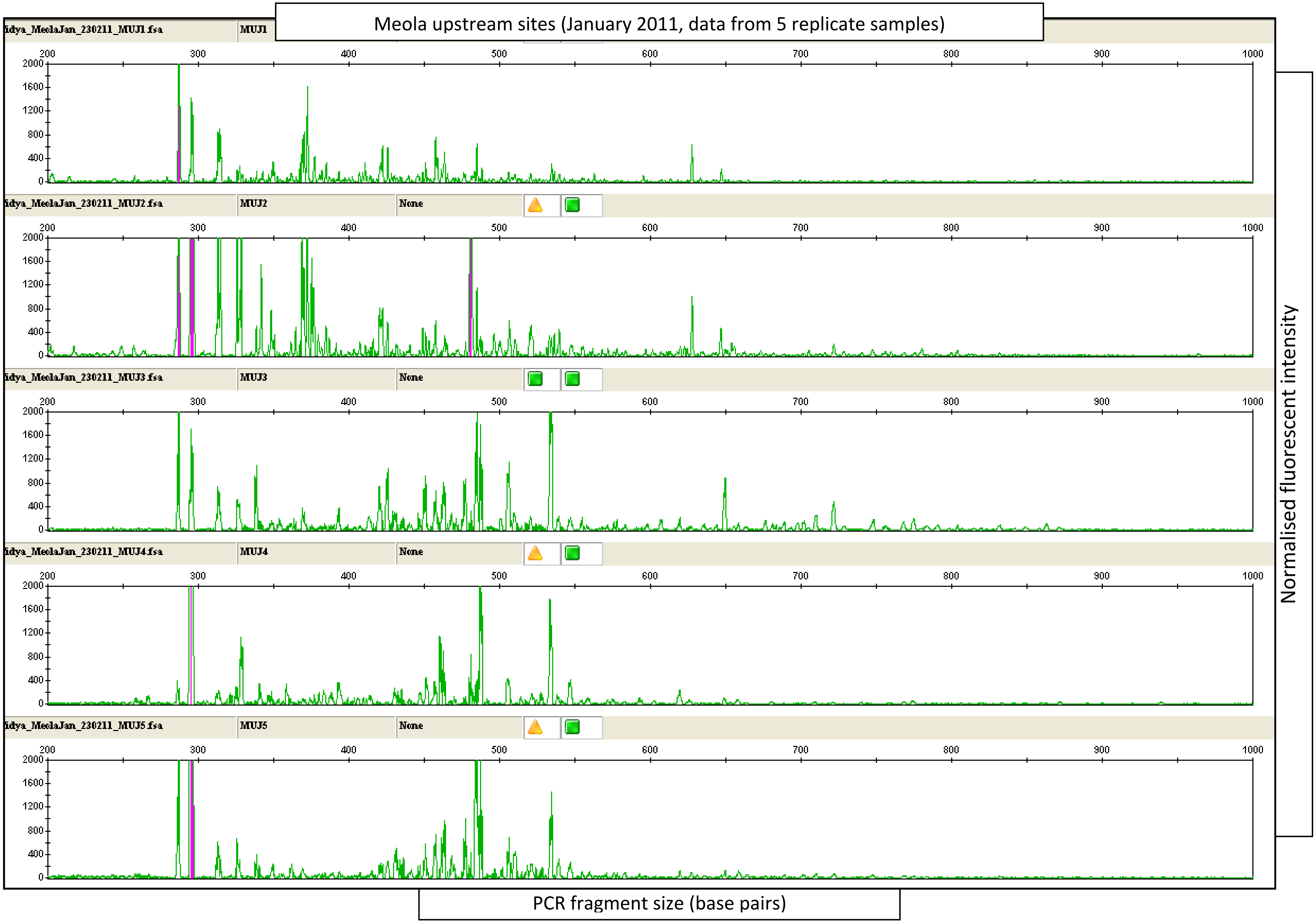


Figure 1 (contd): Bacterial community profiles (BCPs) of biofilms sampled from Meola Creek (upstream, Jan 2011).

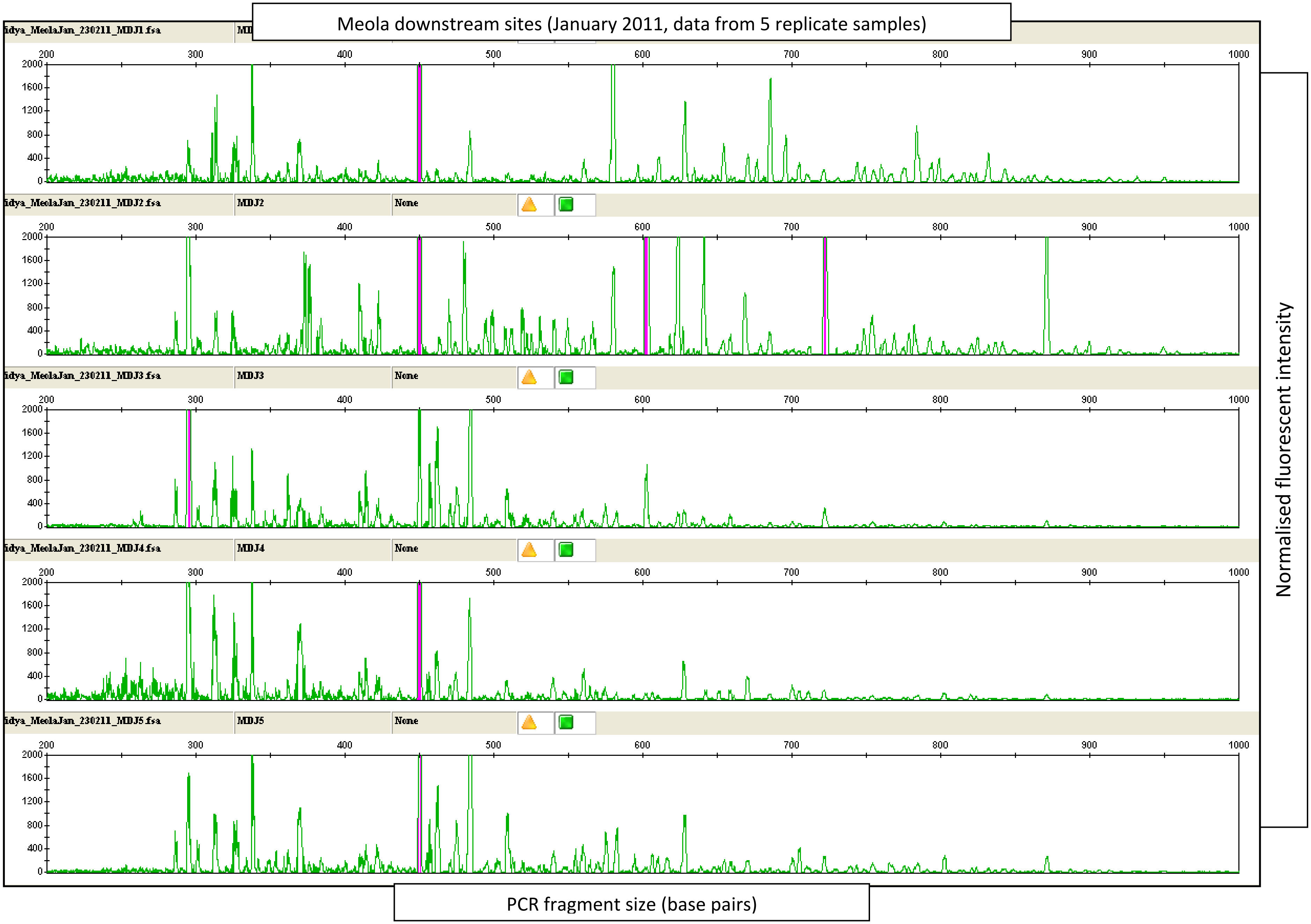


Figure 1: Bacterial Community profiles (BCPs) of biofilms sampled from Meola Creek (downstream January 2011).

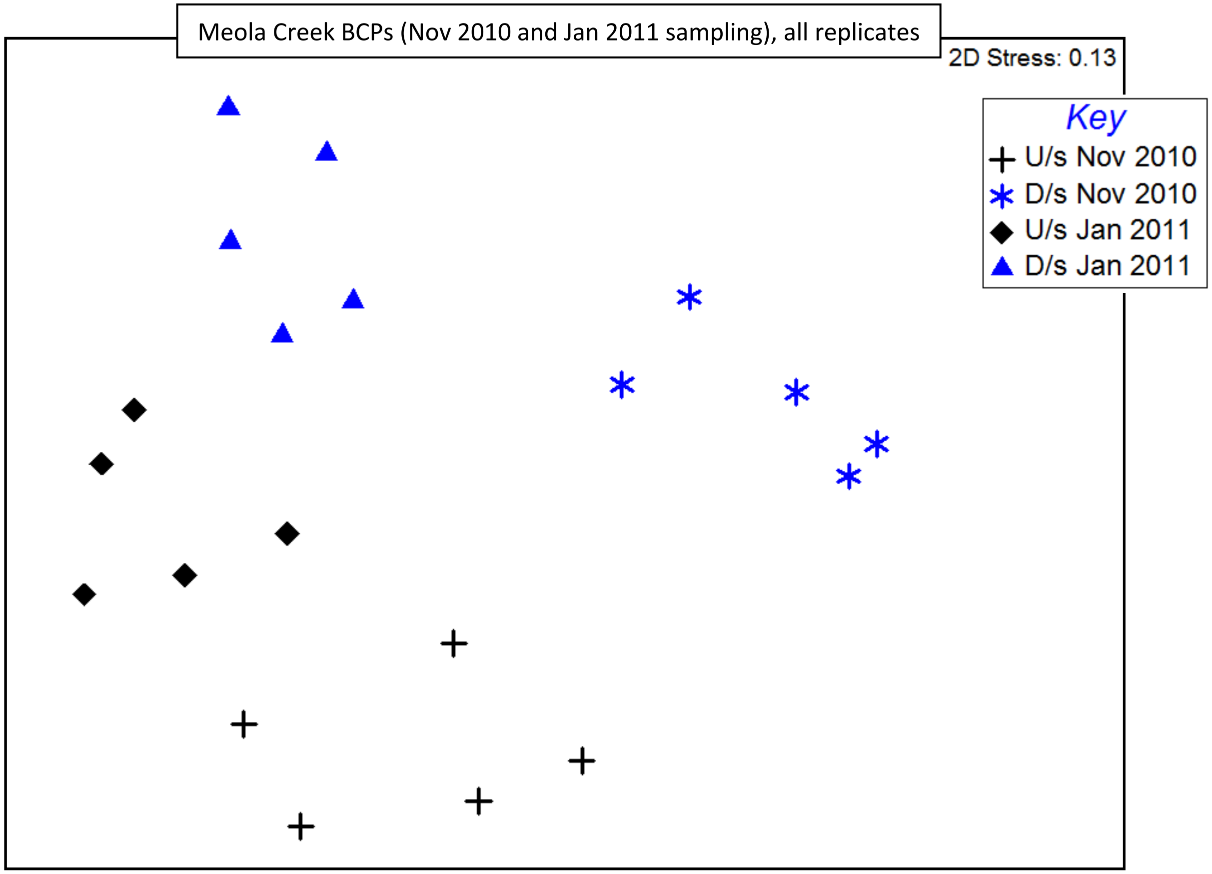
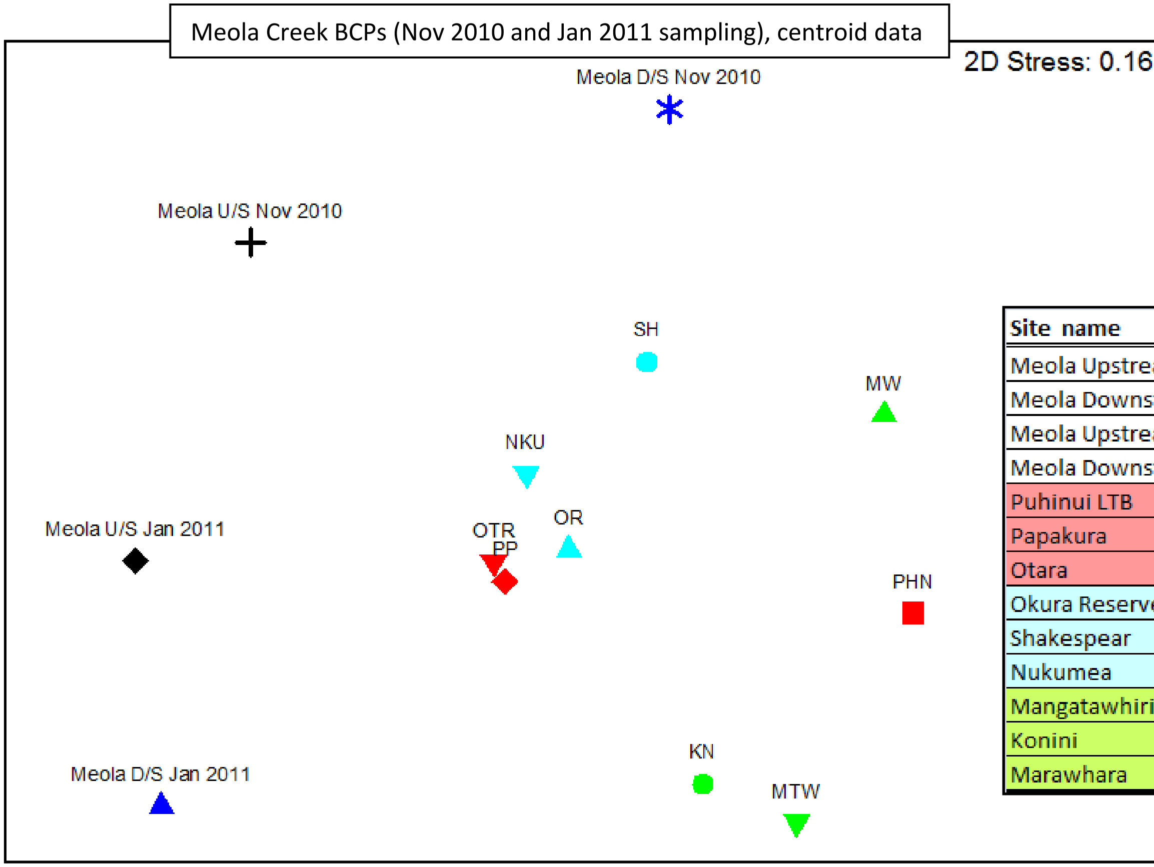


Figure 2: Comparison of bacterial community structure between Meola Creek sites (upstream and downstream), obtained during Nov 2010 and Jan 2011 sampling, all replicate samples are included here. Trial samples (5 upstream and 2 downstream) were taken during initial testing of the biofilm sampling protocol and these were also added. Biofilm samples were collected, taken to the lab and macerated, subjected to DNA extraction and the DNA extracted and subjected to a bacterial community PCR. Bacterial community profiles (BCPs) were obtained based on the lengths of the amplified nucleotide sequences (150 -1000 bp), and similarities in bacterial community structure understood using a multi-dimensional scaling (MDS) plot as shown. The MDS plot is a 2D representation of multiple dimensional relationships between the samples in the form of a scatter plot. In the MDS plot, points that are close together are very similar in community composition (based on diversity and abundance of nucleotide peaks in BCP), and points that are far apart correspond to very different values in terms of the dataset. Stress level of 0.13 suggests that the ordination of points is reliable and not arbitrary. This plot shows a strong clustering of sample replicates within each site, and shows good separation in bacterial community structure between the different sampling sites and times.



Site name	Code	BCI
Meola Upstream Nov 2010	Meola U/s Nov 2010	8.99
Meola Downstream Nov 2010	Meola D/s Nov 2010	9.17
Meola Upstream Jan 2011	Meola U/s Jan 2011	10.06
Meola Downstream Jan 2011	Meola D/s Jan 2011	10.76
Puhinui LTB	PHN	6.18
Papakura	PP	6.44
Otara	OTR	6.49
Okura Reserve	OR	10.11
Shakespear	SH	10.19
Nukumea	NKU	10.39
Mangatawhiri	MTW	13.74
Konini	KN	13.96
Marawhara	MW	14.27

Figure 3: Comparison of bacterial community structure between Meola Creek sites (upstream – u/s, and downstream – d/s, Nov 2010 and Jan 2011), and reference sites from Auckland. Biofilm samples from Meola Creek were collected and processed, the DNA extracted and subjected to a bacterial community PCR. Bacterial community profiles (BCPs) were obtained based on the lengths of the amplified nucleotide sequences, and similarities in bacterial community structure understood using a multi-dimensional scaling plot. For each site, data from all 5 replicate samples were used to obtain a 'centroid' (a central point of the data cloud derived from sample replicates). In the MDS plot, points that are close together are very similar in community composition (based on diversity and abundance of nucleotide peaks in BCP), and points that are far apart correspond to very different values in terms of the dataset. As part of a previous study aimed at scoring ecosystem health based on biofilm bacterial community structure (254 streams across 7 Regions in New Zealand), a valuable metric in the form of the bacterial community indicator (BCI) was established and streams were scaled in the range from 6 – 14. To compare the Meola group of samples with other previously studied sites, a total of 9 reference sites from the Auckland Region were used. To include a wide range of community profiles, 3 streams each were chosen from the low BCI (Puhinui LTB, Papakura, and Otara), mid-range BCI (Okura Reserve, Shakespear and Nukumea) and the high BCI (Mangatawhiri, Konini and Marawhara) end of the BCI spectrum. The plot shows clear separation between the reference Auckland sites: low and mid-range sites are separated from the high BCI sites. The Meola group of samples were clearly located away from the entire group of Auckland reference sites used here. (Data from table 1 is shown for comparison - inset).

Intrepretation:

The above findings are based on two time-point (November 2010 and Jan 2011) assessments of the Meola Creek sites.

1. Upstream and downstream samples show differences on both occasions.
2. BCI values suggest downstream sites show higher quality than upstream samples.
3. Significant differences in BCP and slight increases in BCI are seen between Nov 2010 and January 2011 sampling times. This may be seasonally related, linked to different conditions in the stream with warmer temperatures and summer flows
4. BCI suggest mid-range ecosystem quality comparable to rural streams in the region and significantly higher quality than some other urban streams.

The BCP and BCI offer an entirely novel view of stream ecosystem health. Each focuses on the community structure and inferred function of the organisms most active in energy, carbon nutrient and contaminant cycling and which provide significant input to the food web. These bacterial community based indicators offer an insight into ecosystem function in the absence of more traditional indicators such as macrobenthic invertebrates.

Appendix:

Methodology

Samples were collected by staff of Morphum Environmental and delivered to the laboratory. At each sampling location, sample rocks were removed from the water and biofilm scraped from the entire surface using sterile custom-made "specie-sponges", five individual samples were included for each site. Sponges containing the biofilms were placed into individual sterile bags, frozen on ice and transported to the laboratory. To separate biofilm biomass from the sponges, sterile water was added to each sample bag and macerated. Sponges were then squeezed to remove the entire sample material and transferred into centrifuge tubes, biofilm biomass pelleted by centrifugation and subjected to DNA extraction.

A: Bacterial Community Profile (BCP)

Raw ARISA data was used to convert fluorescence data into electropherograms using GENEMAPPER software (v 3.7). This enabled a comparison of the proportional quantities of different-sized DNA fragments in each sampled community. This software was used to assign a fragment length (in nucleotide base pairs) to peaks, via comparison with the standard ladder (LIZ1200; Applied Biosystems Ltd., Melbourne, Australia). To include a maximum number of peaks while excluding background fluorescence, only peaks with a fluorescence value of 50 U or greater were subsequently analysed. As the 16S-23S region is thought to range between 140 and 1530 bp (Fisher and Triplett 1999), fragments <150 bp were excluded from analysis. No samples contained fragments >1000 bp. The total area under the curve was normalized (to 1.0) to remove differences in profiles caused by different DNA template quantities, and peak size rounded to the nearest whole number. The BCP for each sample therefore consists of 850 variables that represent the length (in bp) of the intergenic spacer region of constituent bacteria, thereby creating a profile of the bacterial community structure within each sample.

B: Bacterial community index (BCI)

In the previous study, a total of 254 streams sites across 7 regional Councils from New Zealand were investigated and BCPs for each site obtained. To enable the construction of a bacterial community index (BCI), data from all sites from all regions was collated; BCP data was trimmed to 200-900 bp and used. Bacterial community indicator data (200-900 bp) and observed MCI value for each stream (2010 sampling) were used to develop a predictive model to estimate the BCI. Finally, to avoid confusion with MCI data, the BCI was deliberately scaled in the range of 0 -20 and in practice appears to span a scale of 6 – 14.

To understand how the Meola samples compared with other Auckland sites investigated in the previous study, BCI values of the same sites used for BCP comparisons (3 each low, intermediate and high-end) were included.

C: Statistical analysis of bacterial community profile data

Statistical analyses were carried out using the PRIMER computer program (version 6, Primer-E Ltd., Plymouth, UK). Bacterial community profiles (BCPs) were compared using multi dimensional scaling based methods and analysis of similarity tools.

To visualize similarities / differences in BCPs between sites, a 'resemblance matrix' was created by comparing every pair of samples based on whether the recorded variables (abundance of each nucleotide bp from 150-1000) showed similar or dissimilar values. The Bray-Curtis similarity is prescribed for biological community data especially that which can be normalised (to a total of 1) to avoid differences from starting material used for investigation (in this case DNA template for PCR). Therefore, this similarity measure was used for biofilm BCP data. Once a matrix of similarities between each pair of samples was established (based on each peak in the BCP), the data was subjected to multi dimensional scaling (MDS) methods. MDS is a non-metric procedure that is robust to outliers and preserves the rank orders of the relative distances among points in the higher dimensional data cloud as well as possible on a smaller number of dimensions. The output of this process is a plot where samples are represented as points in 2D space. This positioning of sample points occurs in a way that relative distances of all points are in the same rank as the relative dissimilarities between them. Therefore the interpretation of an MDS is as follows: points that are close together are very similar in community composition (based on diversity and abundance of nucleotide peaks in BCP), and points that are far apart correspond to very different values in terms of the dataset. The algorithm is iterative and needs to be analysed with a relatively high number of restarts, and the default number used was set to 999. The MDS plot displays a multidimensional comparison between samples, and an indication of how faithfully the high-dimensional relationships are represented in 2D space is indicated by the stress factor. Generally, stress increases with reducing dimensionality of the comparison, and specifically a stress value < 0.1 corresponds to a good ordination with no real prospect of a misleading interpretation. A stress value < 0.2 gives a potentially useful 2D picture, although for values at the upper end of the range too much emphasis should not be placed on the details of the plot, and, a stress value of > 0.3 suggests the points are close to being arbitrarily placed in the 2D ordination space.

As well as plotting the relationship between datasets using MDS, the statistical significance of differences between BCPs were analysed using permutational multivariate analysis of variance (PERMANOVA). Briefly, for each site, BCP data from 5 samples were always used, the number of unique permutations was set to "999" to achieve a statistical significance level of (P value 0.05), and an 'unrestricted permutation of raw data' was carried out.

C: Meola Creek samples within Regional context:

To understand the implications of this pilot study in comparison to previously studied sites from the Auckland region, bacterial community data from three low (Puhinui LTB, Papakura, Otara), intermediate (Okura Reserve, Shakespear, Nukumea) and high (Mangatawhiri, Konini and Marawhara) BCI values were included for analysis.

Appendix E: April 2010 Meola Wet Weather Monitoring Memo

To:	Myles Lind
From:	Caleb Clarke
CC:	Craig McIlroy, Clint Cantrell
Date:	28th June 2010
Subject:	**Meola CSO Monitoring – 27th April 2010**

Background

Morphum Environmental Ltd was engaged to conduct sampling of the Lyons Ave Combined Sewer Overflow (CSO) and the immediate Meola Creek receiving environment during and following a rainfall event on the 27th April 2010 (The Subject Event).

Auckland City has several areas with combined wastewater and stormwater networks. During heavy rain events this results in CSO's into urban watercourses. At the same time stormwater runoff mixes with the CSO's to be transported downstream.

The summer of 2009/2010 has been one of the driest on record and so aquifer levels have been uncommonly low. This has resulted in low baseflows through urban watercourses across the region and in particular Meola Creek. The subject event was considered to be a significant event to target for monitoring for the following reasons:

- **Stream baseflow** - Meola Creek is one of several Auckland watercourses that is underlain by several aquifers which store and release rainfall to supply surface waters with 'clean' base flows. Under higher baseflow conditions Meola Creek has the capacity to flush CSO discharges through its system. However when the aquifer levels are low, there is corresponding marked low water levels in the Creek and subsequently less flushing baseflow.
- **Antecedent conditions** - are also likely to affect overflow load and concentrations. It is hypothesised that during long dry periods, material accumulates within the sewer network. This material is transported during the first event following a long dry period. This leads to higher loadings than events with shorter antecedent dry conditions.
- **Duration** - The mass load and concentration of effluent in a CSO event is impacted by CSO and stormwater flow hydrographs, mixing and dilution. Therefore the beginning of events and shorter events are likely to have

higher concentrations whereas larger events will include more clean water inputs and therefore may contain lower concentrations of pollution.

Method

Based on a draft sampling plan prepared in conjunction with the Central Interceptor Project Team in January 2010, three sampling sites along Meola Creek were selected for sampling during the event.

A sampling location was selected at the Lyons Ave CSO to record the concentration of the contaminants from the CSO itself. This is referred to as LACSO. Two stream sites were selected above and below the Alberton Ave Grille (refer Figure 1). These are referred to as USAAG and DSAAG.

Photographs of the sampling sites (refer figures 2-4) have been provided and illustrate the sites before, during and after the rain event.

A single grab sample (water and sediment) had been previously taken by Morphum at the two stream sites on January 29th following a 30 minute overflow event on January 28th, 2010. These results are included in Appendices to this memo.

For the subject event, synoptic sampling was undertaken at the two stream sites. A baseline sample was taken at 13:00; 27th April 2010. Rain was forecast for later that afternoon and started at 13:40. Figure 5 indicates the timing of the rainfall and measured overflow level. For further information regarding timing of samples refer to the Appendices.

Samples were collected using a Mighty Gripper and appropriate bottles provided by Watercare Laboratory Services Ltd. Samples were placed into a chilly-bin immediately following collection with icepacks to maintain a temperature of 4°C. Samples were transported to the laboratory as soon as possible, generally within 4 hours of collection. Samples collected after lab collection hours were stored in a refrigerator and were received at the lab no more than 12 hours after collection.

Samples were tested at Watercare Laboratory Services Ltd (IANZ accredited) for the parameters listed in the appendices.

Flow information for the Lyons Ave Overflow was provided by AECOM from the trunk wastewater model. The model was run for available rainfall data for the subject event. The model was adjusted for additional losses at the CSO outlet in order to calibrate to measured water levels and observed surcharging.

Measured CSO contaminant concentrations (at the times outlined in Appendices and indicated on Graphs) were interpolated from sample data and factored with modelled flow data to provide mass load pollutographs, cumulative load graphs and Event Mean Concentration (EMC) outputs.

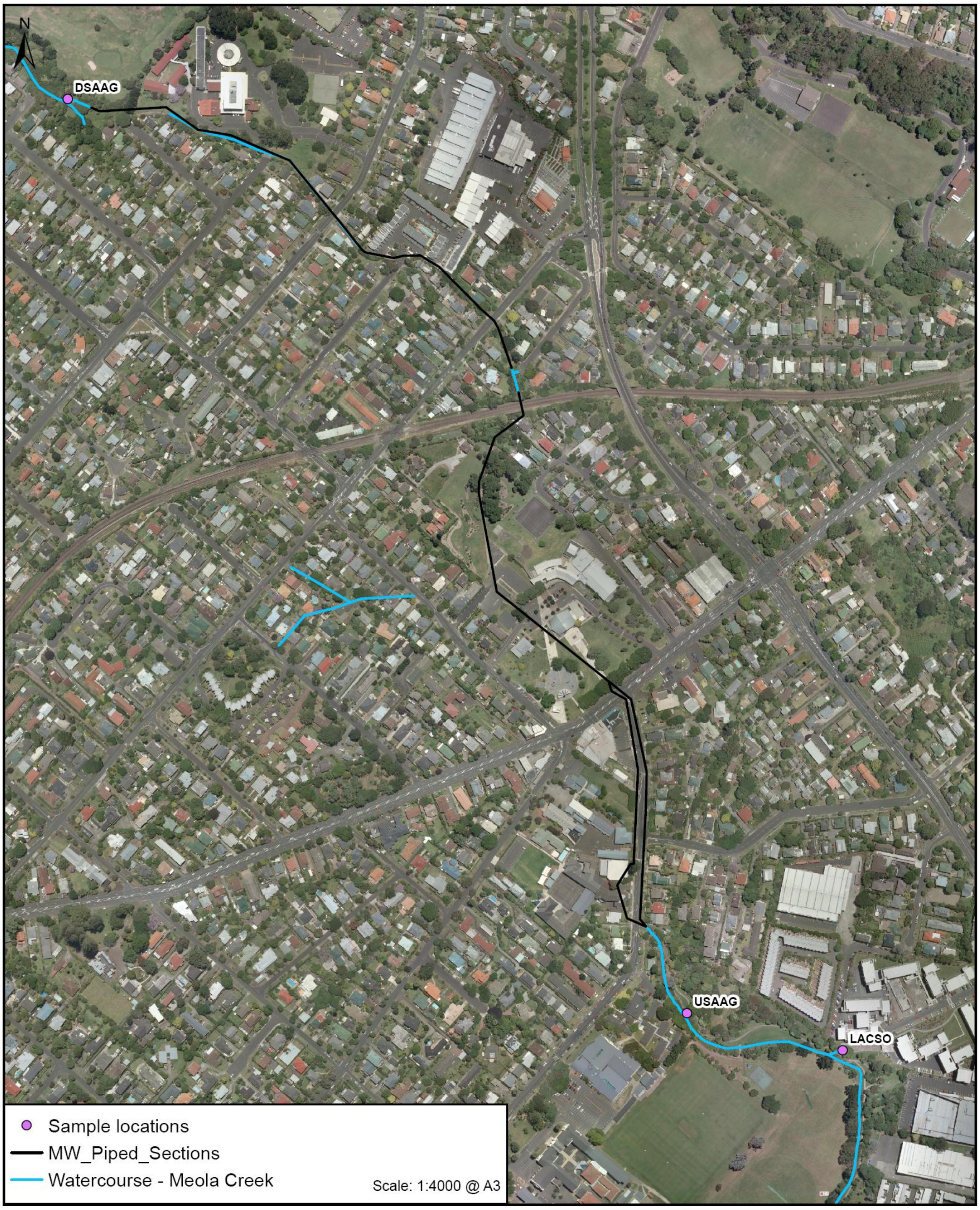


Figure 1 – Sample Locations

Figure 2: LACSO sampling site before and during the rain event.

Figure 3: USAAG site before the rain event and at its peak.

Figure 4: DSAAG site before, during and after the rain event.

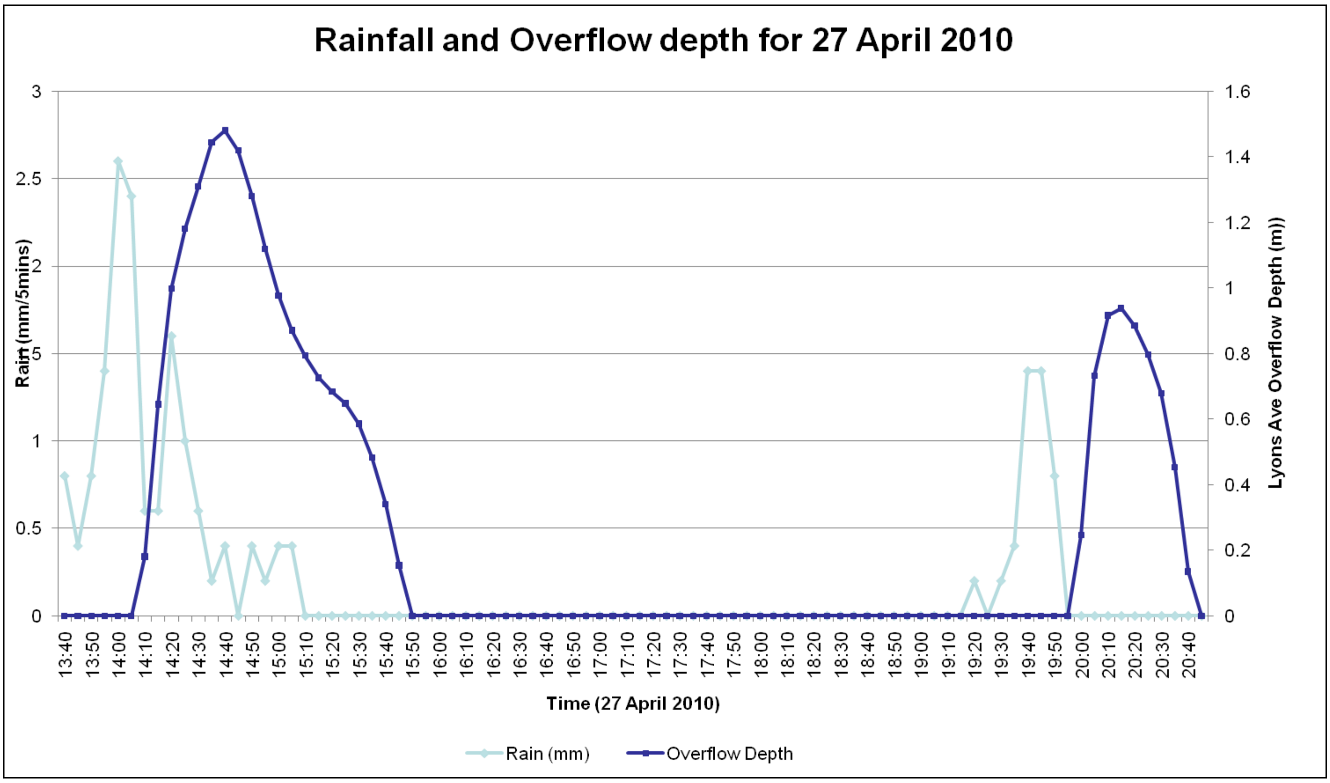


Figure 5: Rainfall and associated overflow response time on 27 April 2010 (Source: AECOM).

Observations

Observations were made on site during the CSO event and at the stream sites. Key observations are detailed following:

- The peak flows from the Lyons Ave CSO occurred earlier than peak flows in the main stream, with a slower response from the main Meola catchment upstream of the overflow.
- During the overflow event a manhole on the Mount Albert Grammar sports fields surcharged. This occurred at 14:35 for approximately 10 minutes.
- Prior to the rain event, the downstream site (DSAAG) was observed to be stagnant and of low clarity. There were no fish present despite there having been fish in the same location in January (inanga, *Galaxias maculatus*). At 02:20 on the 28th of April, after the rain event had subsided there was increased baseflow and inanga and an unidentified eel were observed in the pool.
- Discoloured discharge was observed at the downstream site (DSAAG) at approximately the same time that the Lyons Ave overflow was running, indicating local overflows downstream were operating prior to the Lyons Ave discharge reaching this location.

- The USAAG site in Roy Clements Treeway was characterised by deep anaerobic sediment in the stream bed prior to the rain event. No fauna was observed at this site prior or during the rain event.
- During sampling 24hrs after the event, a discharge of sediment laden water was observed at the upstream USAAG site. This was discharged from the construction site at Mount Albert Grammar School. The USAAG sample was taken above the discharge however the DSAAG sample was affected by this discharge.

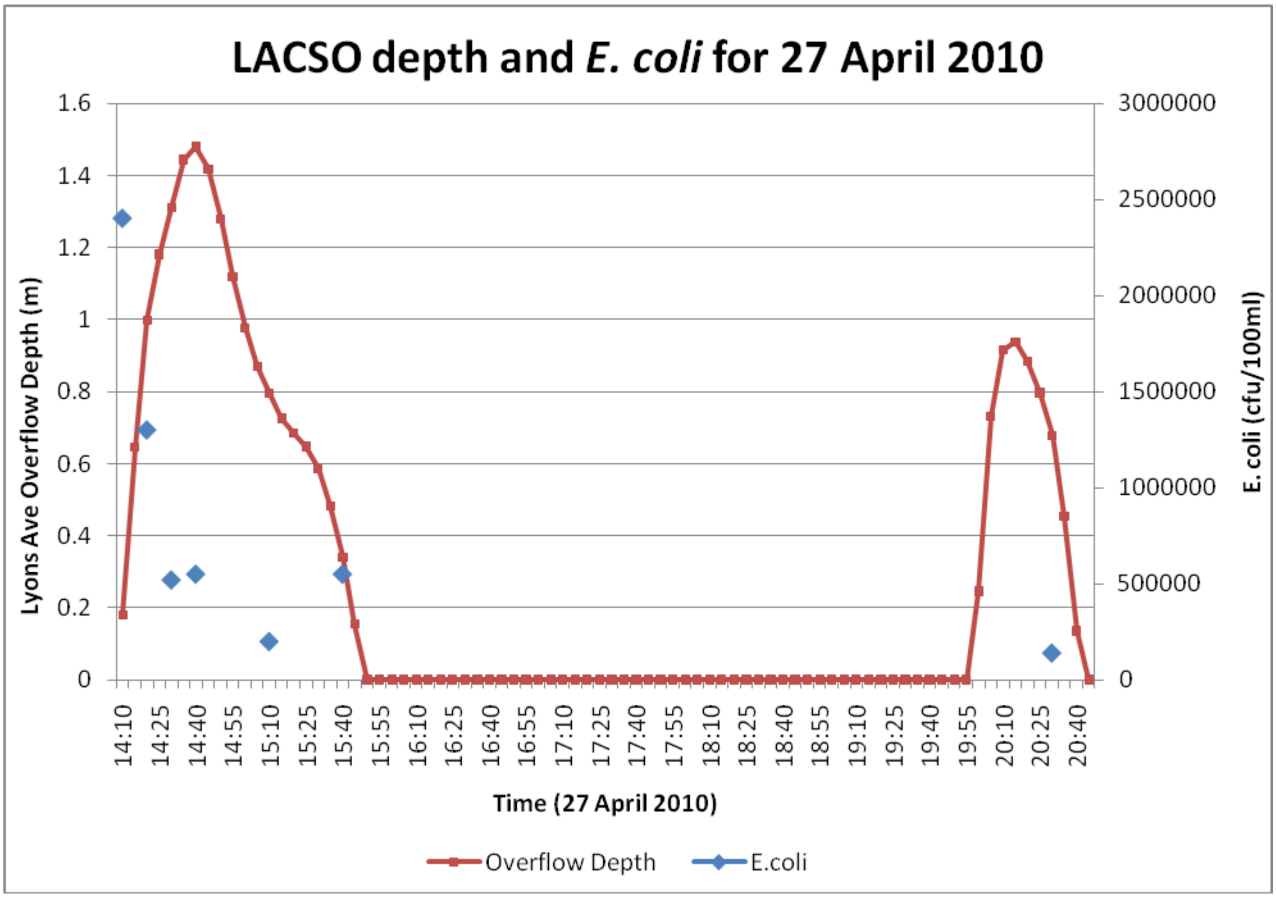
Results

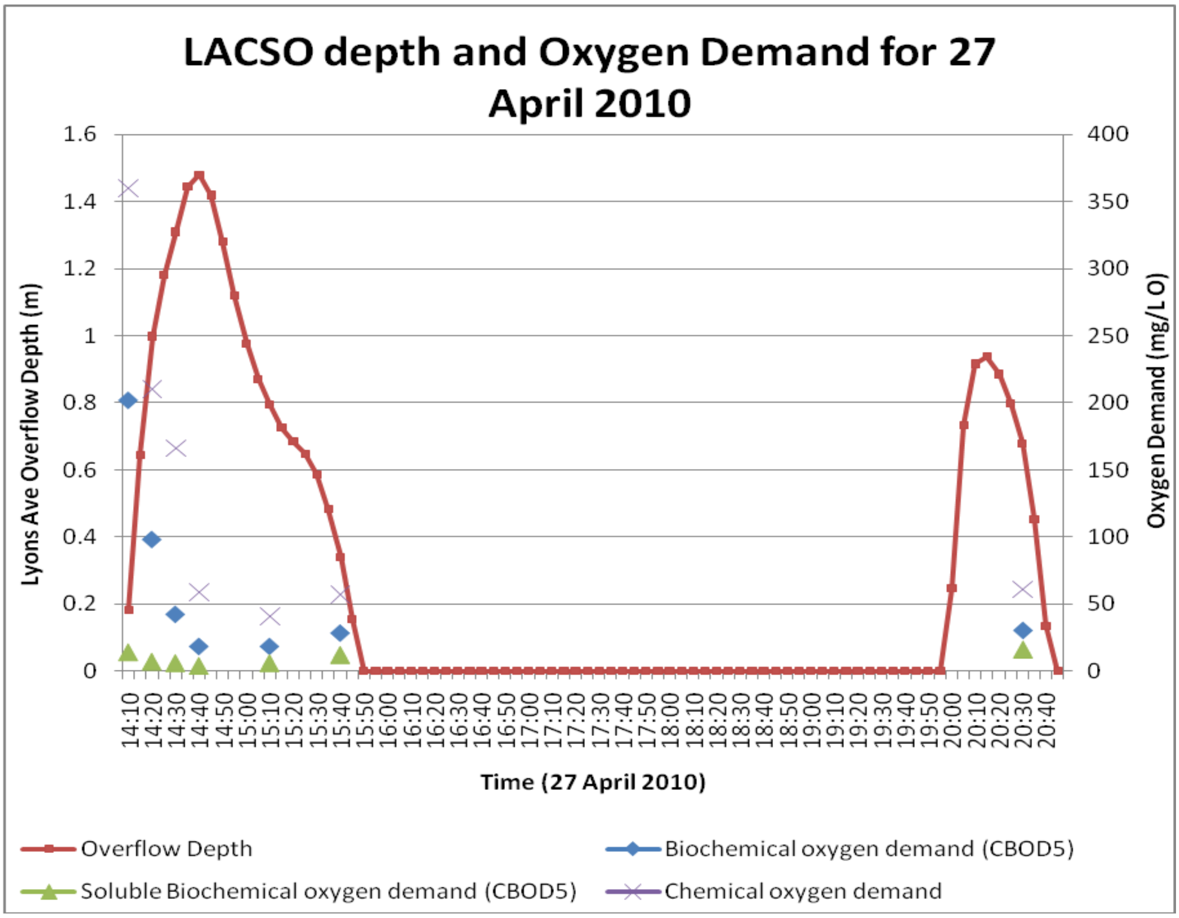
Results for the April 27th 2010 sampling round are included as graphs in the following section.

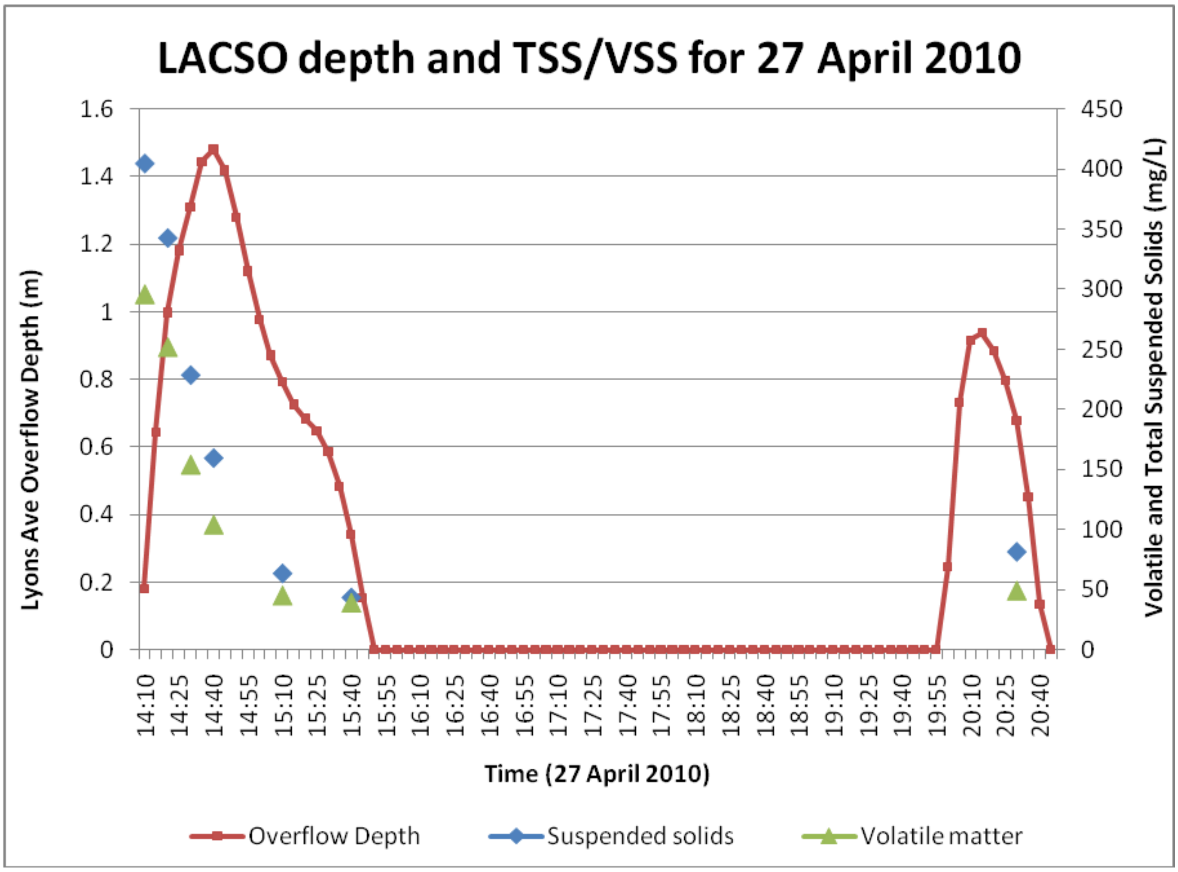
Lyons Ave CSO

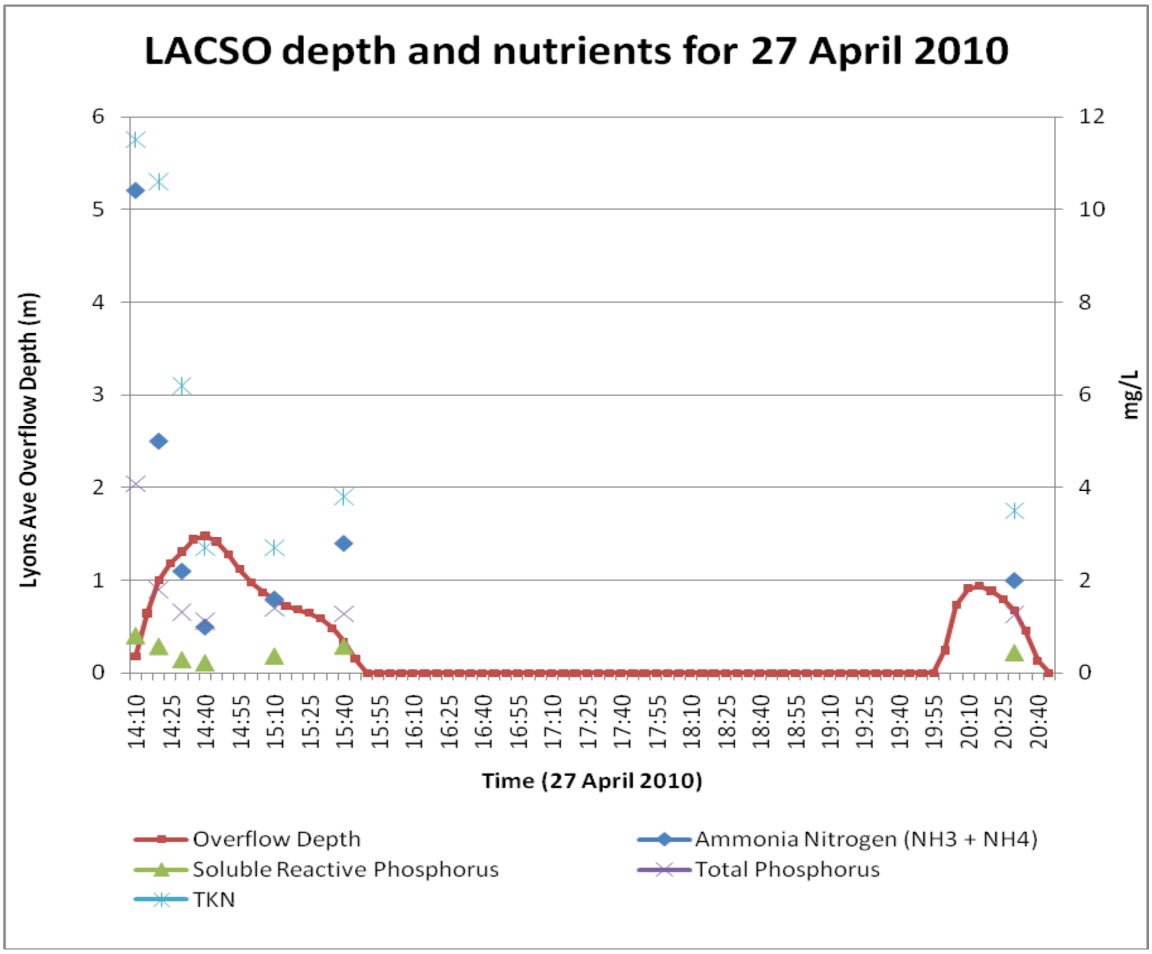
Key results have been summarised and are detailed in graphs following. Raw data results are included in the Appendix of this memo.

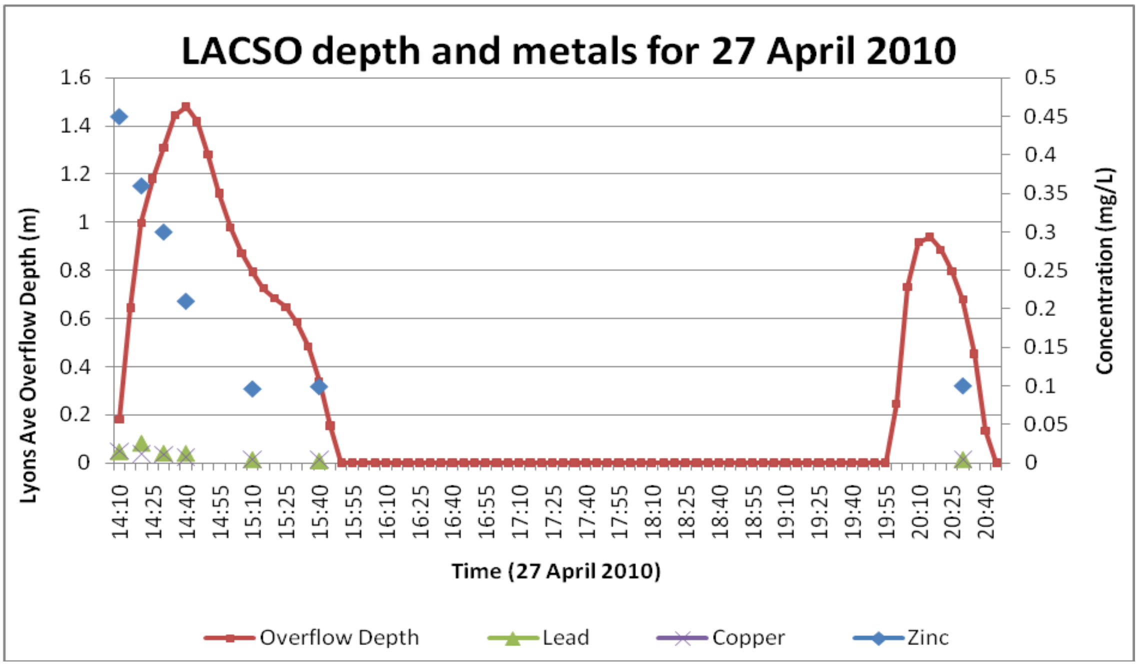
- E. coli maximum concentration of 2.8 million cfu/100 ml
- Suspended solids maximum concentration of 405 mg/L
- Volatile Matter maximum concentration of 296 mg/L
- Zinc was the dominant metal with concentrations approximately 10 times higher than copper and lead.
- Event Mean Concentrations were calculated as follows:
  - E. coli 790,937 cfu/100ml
  - TSS 216 mg/L
  - Ammonia Nitrogen 1.6 mg/L N
  - Zinc 0.41 mg/L



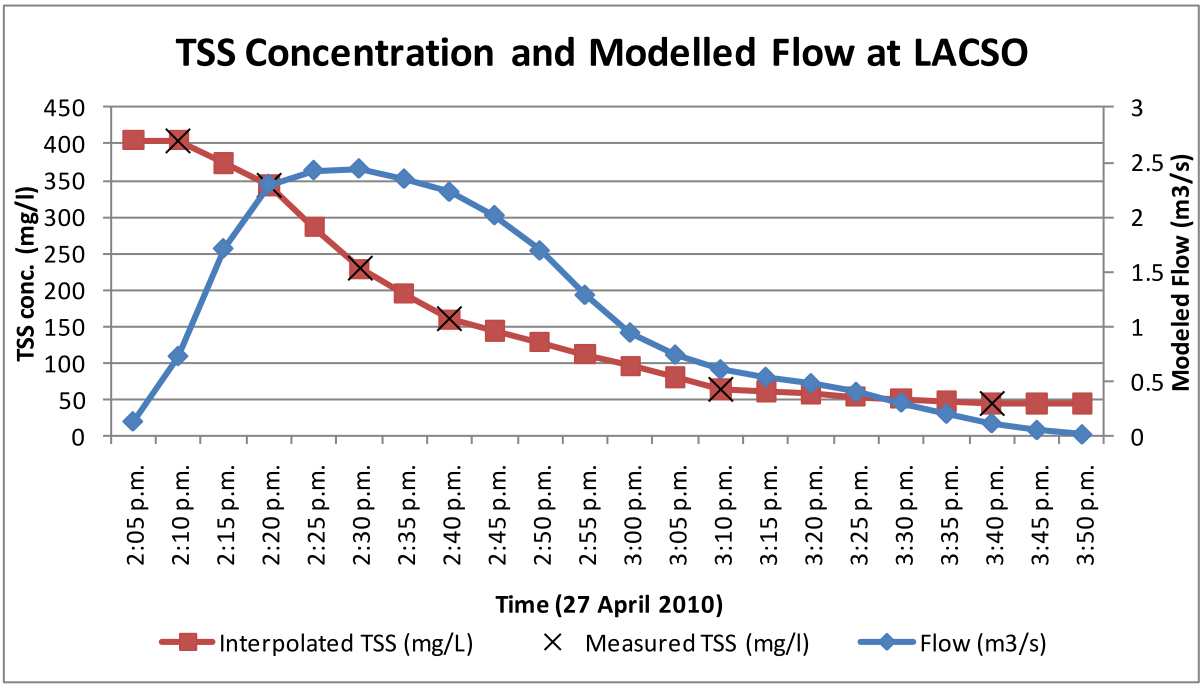

LACSO depth and Oxygen Demand for 27 April 2010
Lyons Ave Overflow Depth (m)
Oxygen Demand (mg/L O)
Time (27 April 2010)
Overflow Depth
Biochemical oxygen demand (CBOD5)
Soluble Biochemical oxygen demand (CBOD5)
Chemical oxygen demand

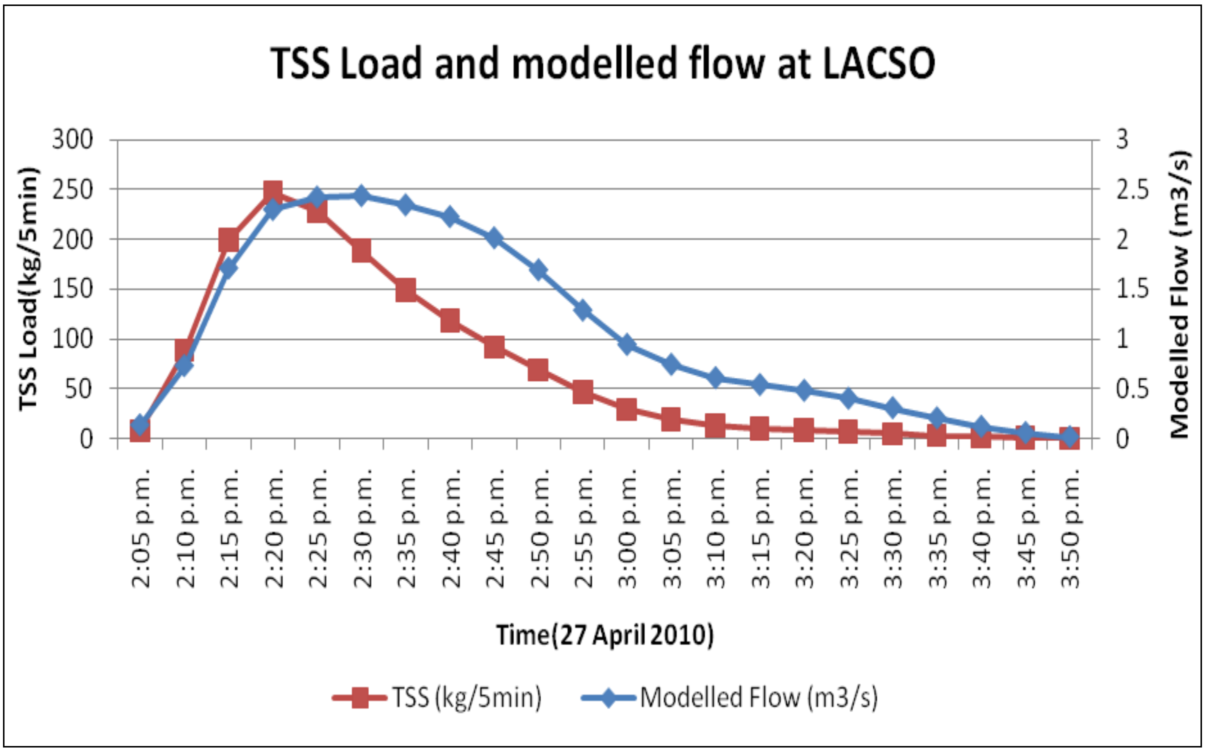

LACSO depth and TSS/VSS for 27 April 2010
Lyons Ave Overflow Depth (m)
Volatile and Total Suspended Solids (mg/L)
Time (27 April 2010)
Overflow Depth
Suspended solids
Volatile matter

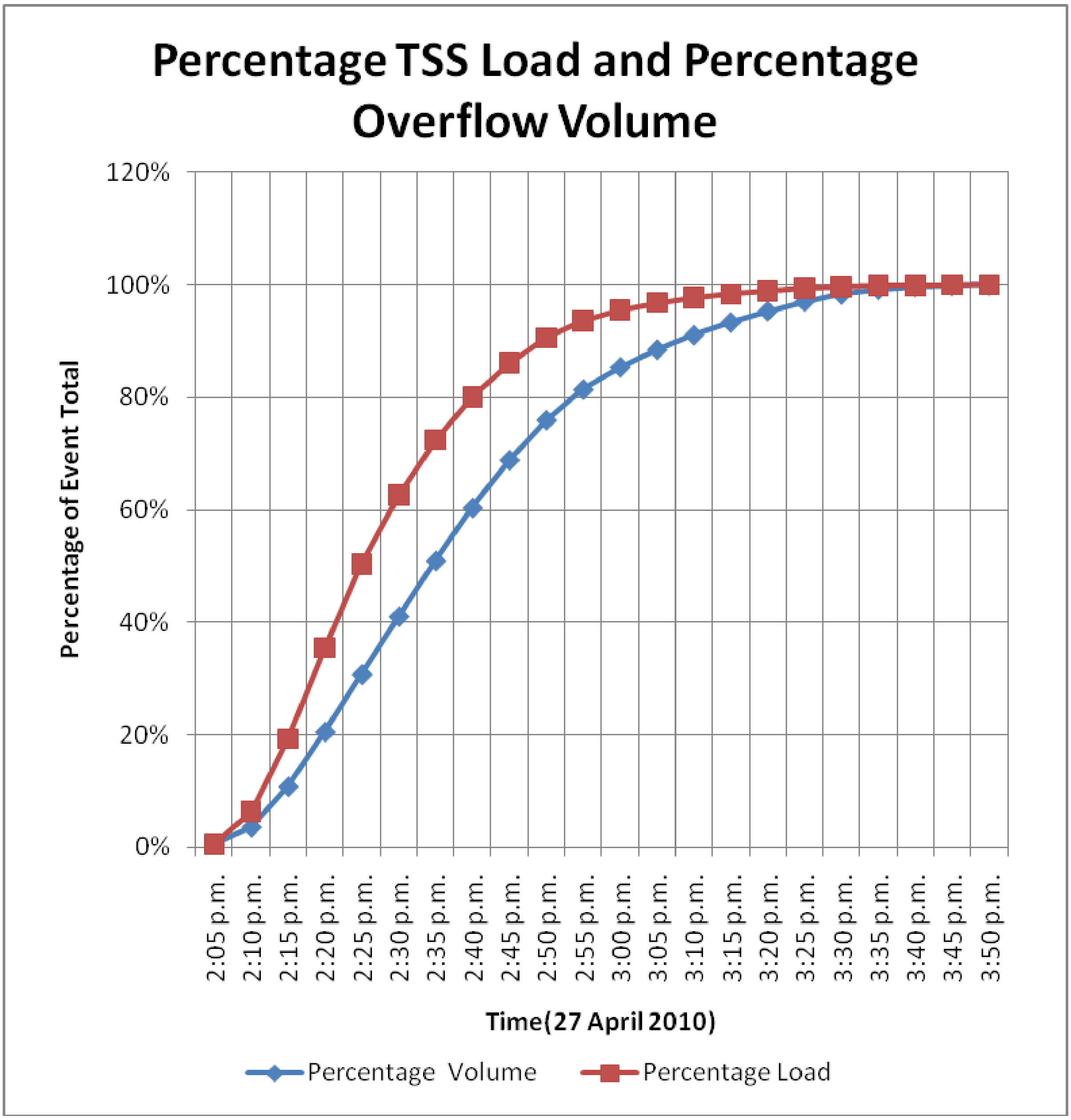

LACSO depth and nutrients for 27 April 2010
Lyons Ave Overflow Depth (m)
mg/L
Time (27 April 2010)
Overflow Depth
Ammonia Nitrogen (NH3 + NH4)
Soluble Reactive Phosphorus
Total Phosphorus
TKN


LACSO depth and metals for 27 April 2010
Lyons Ave Overflow Depth (m)
Concentration (mg/L)
Time (27 April 2010)
Overflow Depth
Lead
Copper
Zinc

The following graphs indicate the TSS concentration processed by interpolating between measured data points and multiplying by flow rate to indicate mass loadings of TSS from the Overflow.







Percentage TSS Load and Percentage Overflow Volume
120%
100%
80%
60%
40%
20%
0%
Percentage of Event Total
2:05 p.m.
2:10 p.m.
2:15 p.m.
2:20 p.m.
2:25 p.m.
2:30 p.m.
2:35 p.m.
2:40 p.m.
2:45 p.m.
2:50 p.m.
2:55 p.m.
3:00 p.m.
3:05 p.m.
3:10 p.m.
3:15 p.m.
3:20 p.m.
3:25 p.m.
3:30 p.m.
3:35 p.m.
3:40 p.m.
3:45 p.m.
3:50 p.m.
Time(27 April 2010)
Percentage Volume
Percentage Load

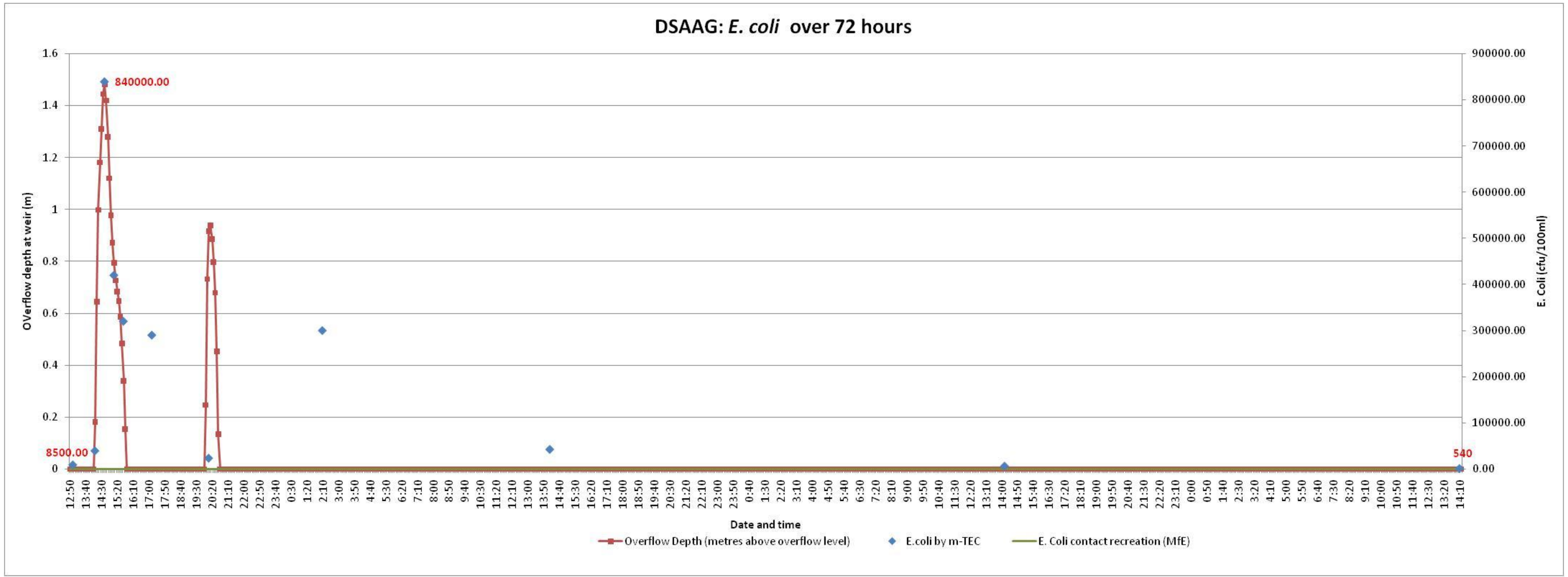
StreamSampling Sites – USAAG & DSAAG

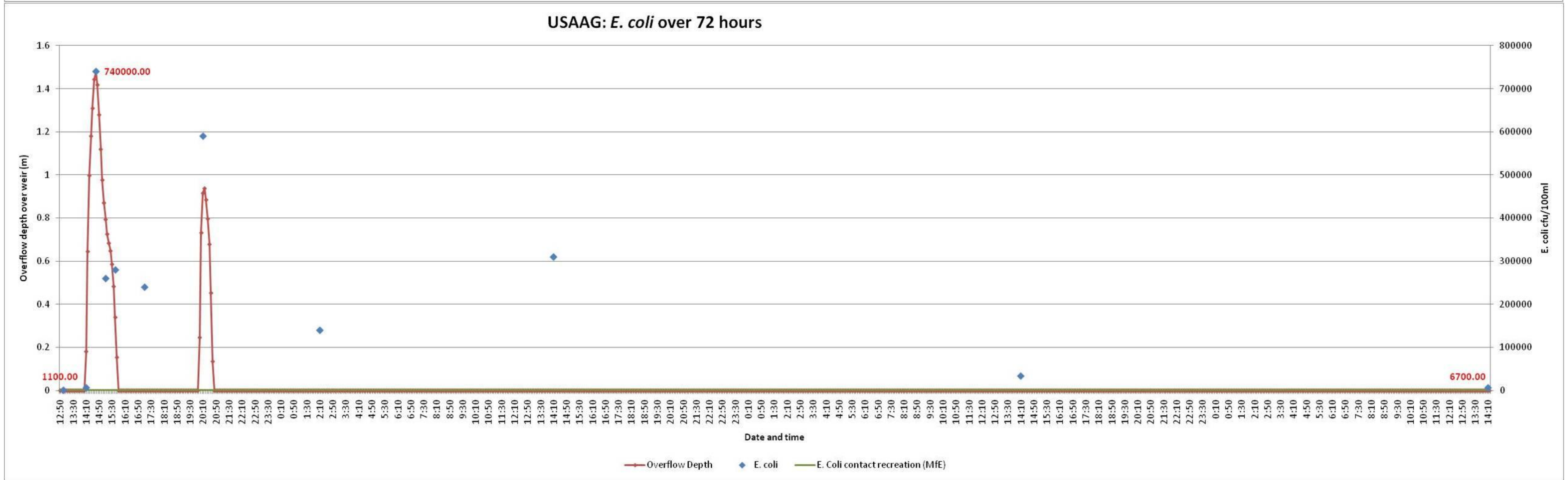
Summary results:

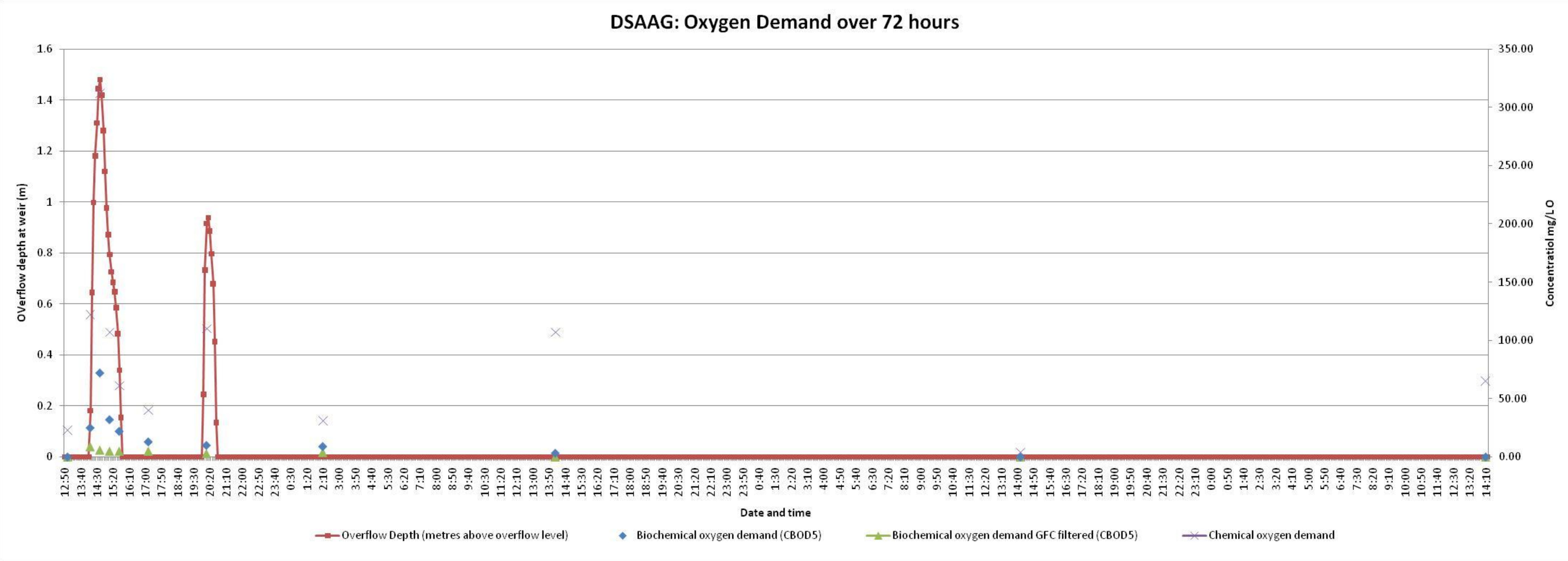
	USAAG	DSAAG
E. coli	Baseline 1100cfu/100 ml Max. 740,000cfu/100 ml 72 hour 6700cfu/100 ml	Baseline 8500cfu/100 ml Max. 860,000cfu/100 ml 72 hour 540cfu/100 ml
BOD	Maximum concentration of 66mg/L O	Maximum concentration 72mg/L O
COD	Maximum concentration of 169 mg/L O	Maximum concentration 312 mg/L O
TSS	Maximum concentration of 384 mg/L	Maximum concentration 932 mg/L
Nutrients	Maximum concentration: TKN 7.1 mg/L N Soluble Phosphorous 0.279 mg/L Ammonia Nitrogen 2.6 mg/L N	Maximum concentration: TKN 9.3 mg/L N Soluble Phosphorous 0.179 mg/L Ammonia Nitrogen 2.0 mg/L N
Metals	Maximum concentration: Zinc 0.31 mg/L Lead 0.051 mg/L Copper 0.036 mg/L	Maximum concentration: Zinc 0.5 mg/L Lead 0.1 mg/L Copper 0.079 mg/L

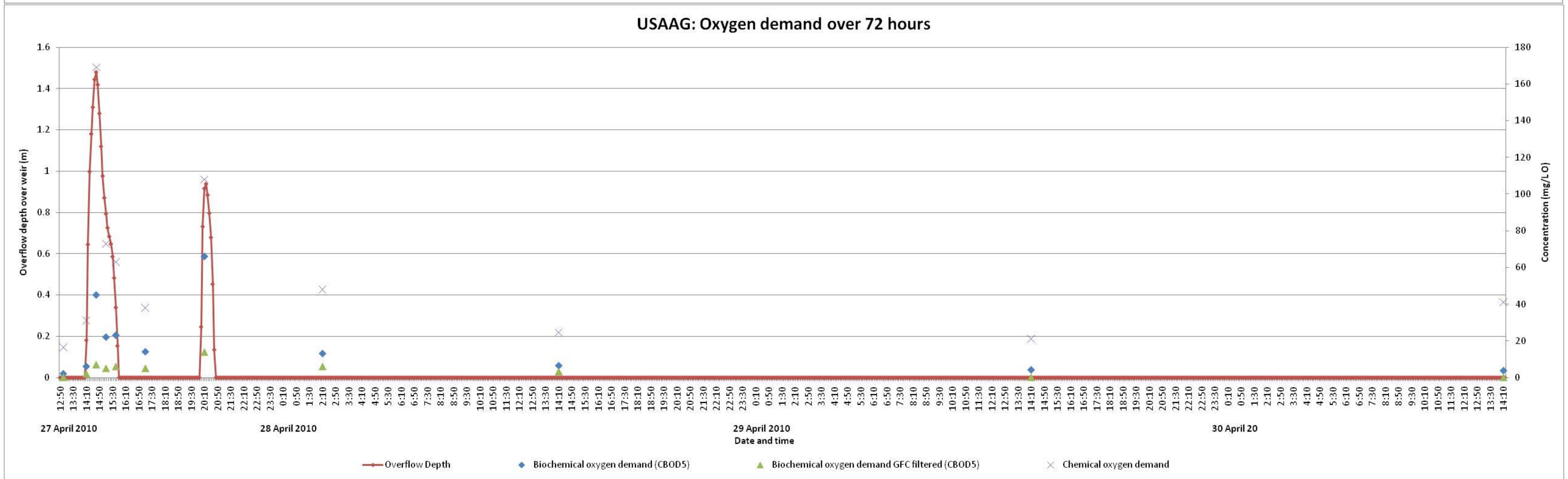
Graphs are of the stream monitoring results are included for each of the following parameters:

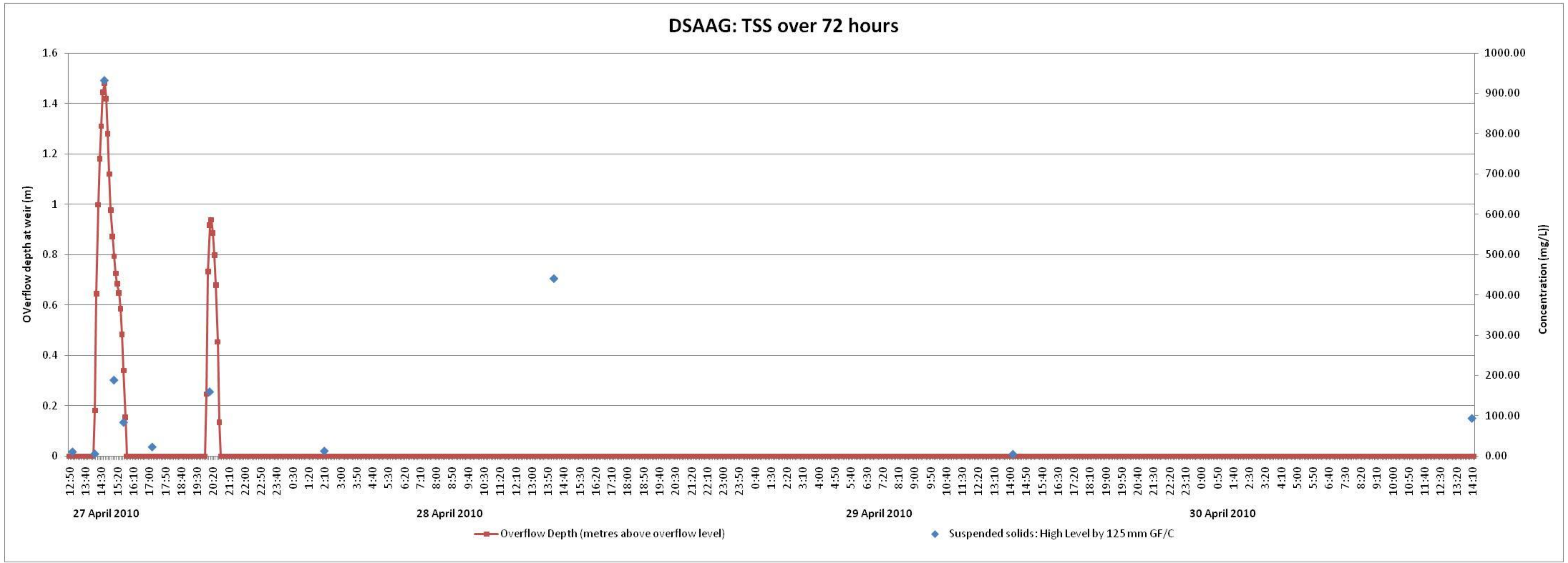
- *E. coli;*
- BOD;
- TSS;
- Nutrients;
- Metals.
- Dissolved Oxygen

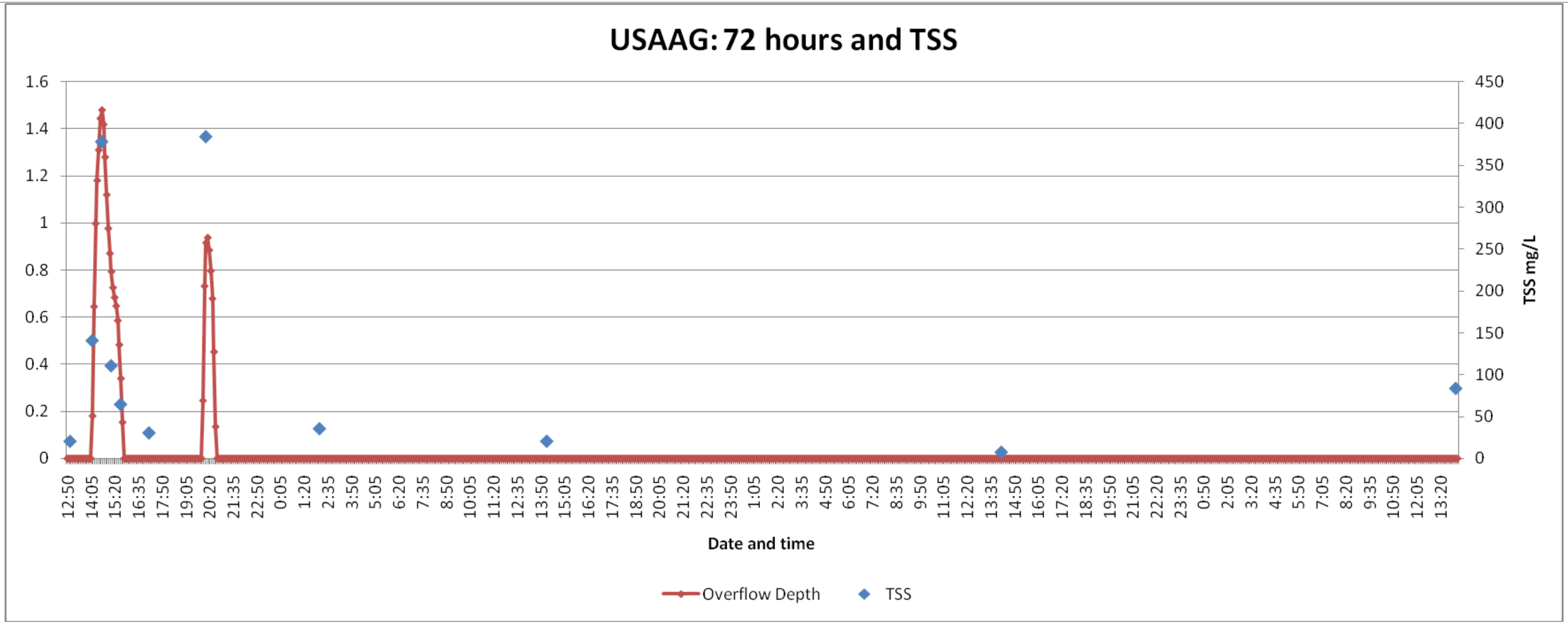

DSAAG: E. coli over 72 hours
OVerflow depth at weir (m)
E. Coli (cfu/100ml)
840000.00
8500.00
540
Date and time
Overflow Depth (metres above overflow level)
E.coli by m-TEC
E. Coli contact recreation (MfE)

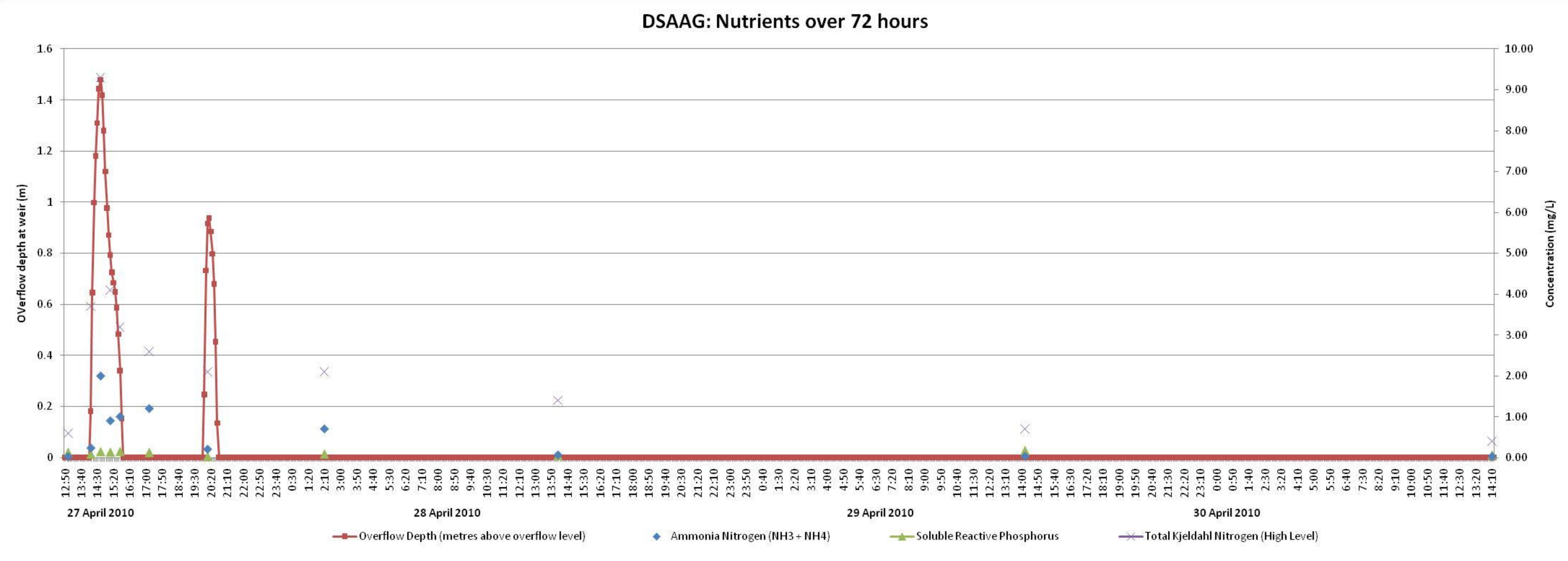

USAAG: E. coli over 72 hours
Overflow depth over weir (m)
E. coli cfu/100ml
740000.00
1100.00
6700.00
Date and time
Overflow Depth
E. coli
E. Coli contact recreation (MfE)

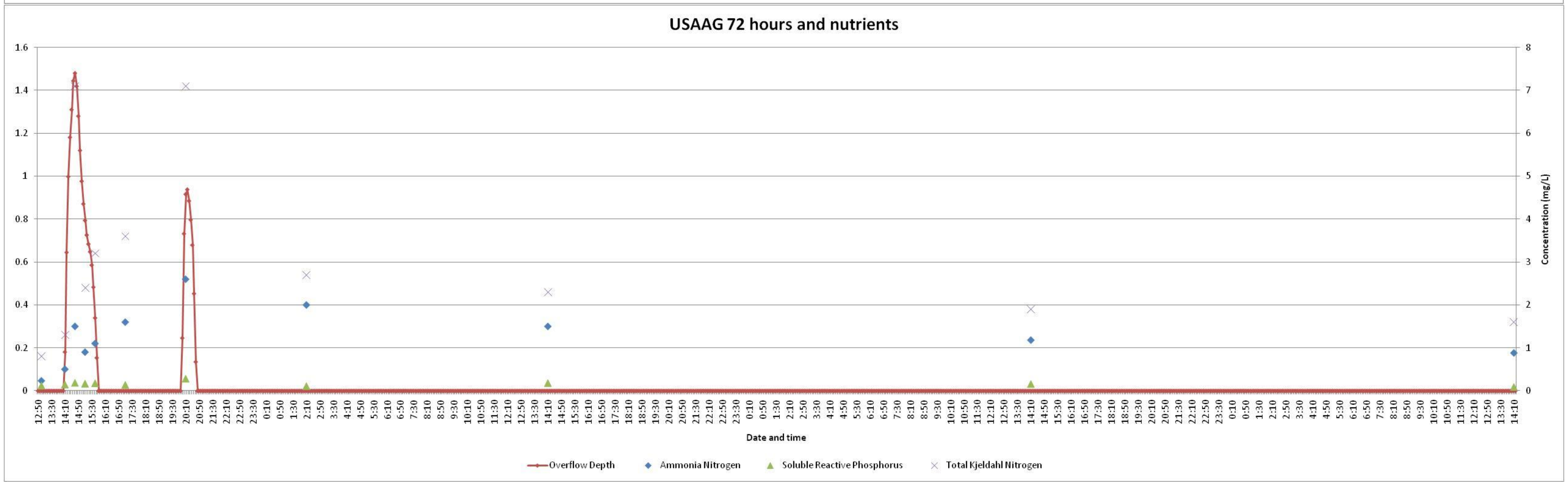

DSAAG: Oxygen Demand over 72 hours
OVerflow depth at weir (m)
Concentratiol mg/L O
Date and time
Overflow Depth (metres above overflow level)
Biochemical oxygen demand (CBOD5)
Biochemical oxygen demand GFC filtered (CBOD5)
Chemical oxygen demand

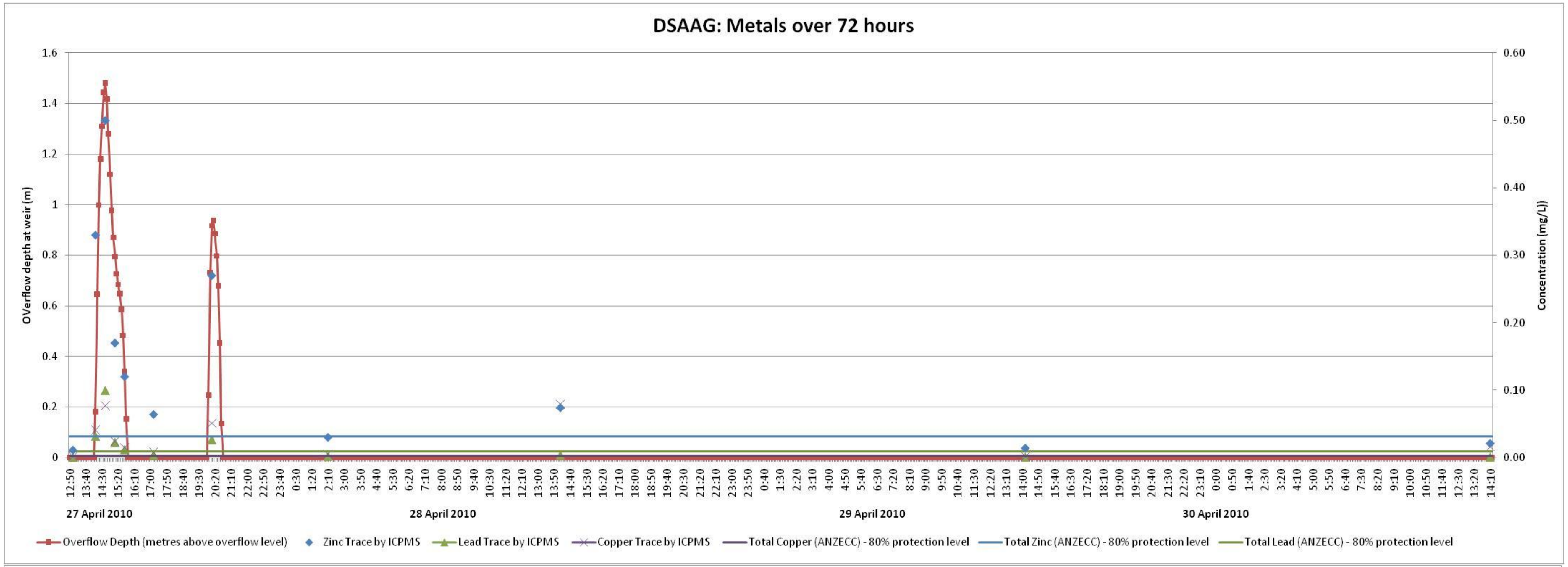

USAAG: Oxygen demand over 72 hours
Overflow depth over weir (m)
Concentration (mg/L O)
27 April 2010
28 April 2010
29 April 2010
30 April 20
Date and time
Overflow Depth
Biochemical oxygen demand (CBOD5)
Biochemical oxygen demand GFC filtered (CBOD5)
Chemical oxygen demand

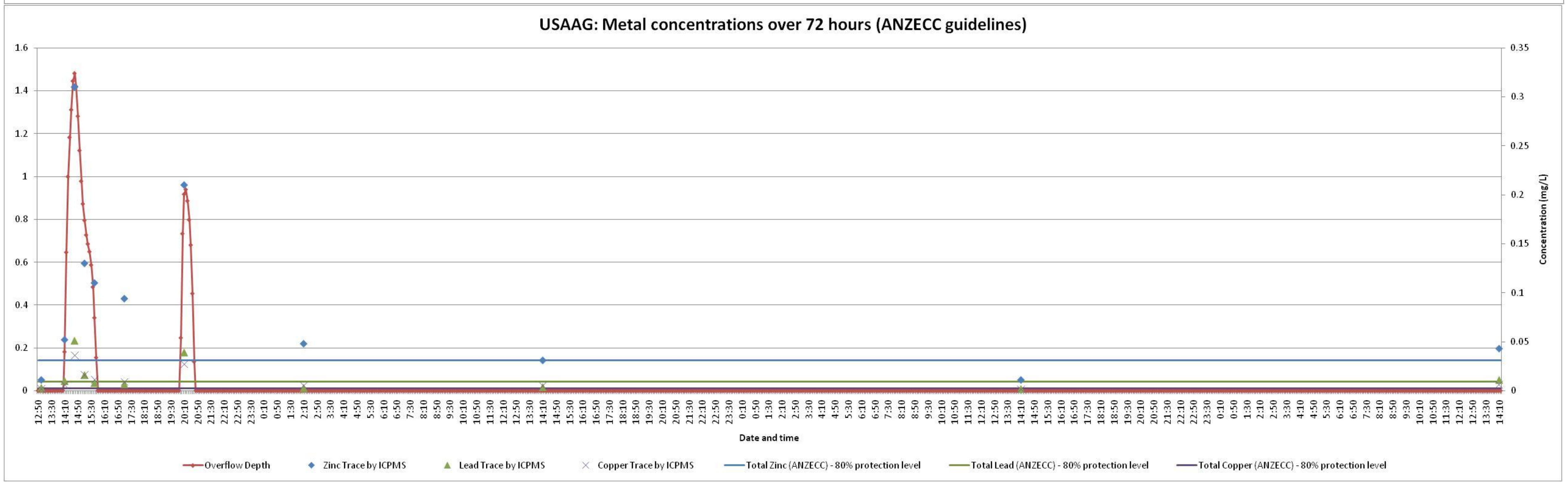

DSAAG: TSS over 72 hours
OVerflow depth at weir (m)
Concentration (mg/L))
27 April 2010
28 April 2010
29 April 2010
30 April 2010
Overflow Depth (metres above overflow level)
Suspended solids: High Level by 125mm GF/C

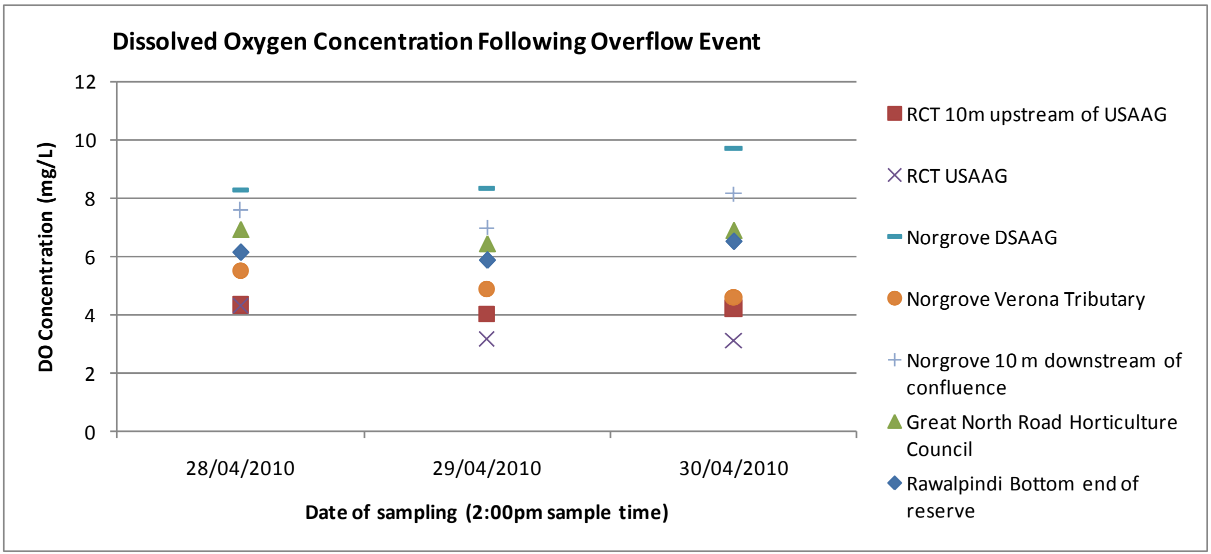

USAAG: 72 hours and TSS
TSS mg/L
Date and time
Overflow Depth
TSS


DSAAG: Nutrients over 72 hours
OVerflow depth at weir (m)
Concentration (mg/L)
27 April 2010
28 April 2010
29 April 2010
30 April 2010
Overflow Depth (metres above overflow level)
Ammonia Nitrogen (NH3 + NH4)
Soluble Reactive Phosphorus
Total Kjeldahl Nitrogen (High Level)


USAAG 72 hours and nutrients
Concentration (mg/L)
Date and time
Overflow Depth
Ammonia Nitrogen
Soluble Reactive Phosphorus
Total Kjeldahl Nitrogen


DSAAG: Metals over 72 hours
OVerflow depth at weir (m)
Concentration (mg/L))
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0.60
0.50
0.40
0.30
0.20
0.10
0.00
27 April 2010
28 April 2010
29 April 2010
30 April 2010
Overflow Depth (metres above overflow level)
Zinc Trace by ICPMS
Lead Trace by ICPMS
Copper Trace by ICPMS
Total Copper (ANZECC) - 80% protection level
Total Zinc (ANZECC) - 80% protection level
Total Lead (ANZECC) - 80% protection level


USAAG: Metal concentrations over 72 hours (ANZECC guidelines)
Concentration (mg/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Date and time
Overflow Depth
Zinc Trace by ICPMS
Lead Trace by ICPMS
Copper Trace by ICPMS
Total Zinc (ANZECC) - 80% protection level
Total Lead (ANZECC) - 80% protection level
Total Copper (ANZECC) - 80% protection level



Summary

The information obtained in this sampling indicates an obvious first flush effect within the CSO discharge. This data has provided important information indicating the variation in concentration and loading across an event. This indicates that event mean concentration is likely to vary significantly depending on scale and duration of a CSO event.

The loading from particular combined sewer overflows is likely to vary by event and catchment configuration. Therefore specific water quality monitoring of other events and CSO locations in the Watercare network would provide a useful range of load profiles. In addition, the impact of CSO's on the stream receiving environment is likely to vary with seasonal conditions including base flow and temperature.

Therefore further investigation and assessment is recommended to determine the impact of CSO's on the receiving environment in a range of seasonal conditions

The water quality in the stream receiving environment during an event will be governed by loadings from the various wet weather inputs and dilution specific to the rainfall event.

Following an overflow event, a portion of the contamination delivered to the stream will remain in the water body or accumulated sediments. The remaining contamination will include carbonaceous substances and nutrients that promote plant and bacterial growth that can deplete dissolved oxygen (DO). This oxygen depletion will be moderated by dilution from clean dry weather base flows, and will vary with diurnal cycles. If DO levels drop below 5 mg/l, aquatic organisms will be placed under stress, with mortality expected for dissolved oxygen levels of less than 3 mg/l for prolonged periods.

The instantaneous measurements of DO showed a separation of values, with the low energy environments (RCT and the short Verona tributary) showing decreasing DO levels and the higher energy, higher baseflow locations showing an increasing DO trend following the discharge.

There are many factors that contribute to this DO response and critical DO levels may be reached at various times in the day. Therefore continuous monitoring is preferable to provide comprehensive information of the effect of CSO loadings on aquatic DO.

Recommendations

- Undertake a more comprehensive sampling regime including:
    - Multiple CSO locations;
    - Various catchments;
    - A range of seasonal conditions .
- Sample at key nodes in the catchment to reflect wastewater and background stormwater loadings. This can then support modelling to determine contaminant loadings into the receiving environment.
- A key receiving environmental impact from CSO's is the effect on Dissolved Oxygen (DO). Therefore continuous sampling of DO should be undertaken for several days following sampled overflow events in order to obtain information on the DO impacts.
- Water quality modelling of CSO's and receiving environments should consider the first flush concentrations and a range of mass load pollutograph shapes rather than EMC's, This will be allow modelling to more effectively determine impact on the stream receiving environment and allow the assessment of benefit for mitigation options.

Appendices

Sample timings and parameters tested

CSO Sample	LACSO	Comments
LACSO_2704_1	14:10	First flush
LACSO_2704_2	14:20	
LACSO_2704_3	14:30	
LACSO_2704_4	14:40	
LACSO_2704_5	15:10	Synoptic with stream sample
LACSO_2704_6	15:40	Synoptic with stream sample
LACSO_2704_7	20:30	Second overflow

Stream Sample	DSAAG/USAAG	Comments
27/04/2010		
	13:00	Baseline
	14:10	Synoptic with first flush
	14:40	
	15:10	
	15:40	
	17:10	
	20:10	
28/04/2010		
	02:10	12 hour
	14:10	24 hours
29/04/2010		
	14:10	48 hours
30/04/2010		
	14:10	72 hours

Parameters tested	LACSO	USAAG/ DSAAG
E. coli (cfu/100ml)	√	√
Alkalinity (mg/L $CaCO_3$)	√	√
CBOD5 (mg/L O)	√	√
Soluble CBOD5 (mg/L O)	√	√
COD (mg/L O)	√	√
Ammonia Nitrogen (mg/L N)	√	√
Soluble Reactive Phosphorous (mg/L)	√	√
Total Phosphorous (mg/L)	√	-
pH	√	√
Suspended Solids (mg/L)	√	√
Volatile Matter (mg/L)	√	-
TKN (mg/L N)	√	√
Copper (mg/L)	√	√
Lead (mg/L)	√	√
Zinc (mg/L)	√	√

January Sampling Round

		Site 1 (USAAG)– 29/01/2010	Site 2 (DSAAG)- 29/01/2010
Water			
Copper	mg/L	<0.0002	0.00078
Zinc	mg/L	0.0026	0.012
E. coli	cfu/100ml	226000	61000
BOD	mg/L O	10.3	3.5
Ammonia Nitrogen	mg/L N	1.51	0.03
Nitrite Nitrogen	mg/L N	<0.002	<0.002
Nitrate Nitrogen	mg/L N	<0.002	2.18
Nitrate and Nitrite Nitrogen	mg/L N	<0.004	2.182
Total Dissolved Phosphorous	mg/L	0.21	0.3
Total Dissolved Solids	mg/L	125	169
DO	mg/L	2.2	9.5
pH		7.4	7.4
TKN	mg/L N	2.7	0.9
Turbidity	NTU	12.6	5.08
Sediment			
Copper	mg/kg	41	99
Lead	mg/kg	79	470
Zinc	mg/kg	260	350
BOD	mg/kg O	229	172
Dry weight % sludge	%w/w	62.1	82.4
TKN	mg/kg drywt	1770	300
TOC	%w/w	2.42	1.5

Watercare Laboratory Services Ltd: Results