

QA/QC Compliance Assessment to assist with Quality Review

Work Order : **EM2013637** Page : 1 of 11

Client : Dept for Environment & Water : Laboratory : Environmental Division Melbourne

 Contact
 : Mr FRANK MANGERUCA
 Telephone
 : +61881625130

 Project
 : HCHB
 Date Samples Received
 : 06-Aug-2020

 Site
 : --- Issue Date
 : 12-Aug-2020

Sampler : JOSHUA CASTLE No. of samples received : 19
Order number : ---- No. of samples analysed : 19

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers: Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers: Analysis Holding Time Compliance

• Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers: Frequency of Quality Control Samples

Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Page : 2 of 11 Work Order : EM2013637

Client : Dept for Environment & Water

Project · HCHE

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED045G: Chloride by Discrete Analyser	EM2013654001	Anonymous	Chloride	16887-00-6	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.

Outliers: Analysis Holding Time Compliance

Matrix: WATER

Matrix: WATER							
Method		Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
				overdue			overdue
EA045: Turbidity							
Clear Plastic Bottle - Natural							
Murray Mouth,	US Tauwitchere,				07-Aug-2020	06-Aug-2020	1
DS Tauwitchere,	Mark Point						

Outliers: Frequency of Quality Control Samples

Matrix: WATER

Matrix. WATER					
Quality Control Sample Type	Co	unt	Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a, b and c	0	19	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)					
Chlorophyll a, b and c	0	19	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for <u>VOC in soils</u> vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive <u>or</u> Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER Evaluation: ▼ = Holding time breach; ✓ = Within holding time.

Method	Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation

Page : 3 of 11 Work Order : EM2013637

Client : Dept for Environment & Water



Matrix: WATER			Evaluation	ı: 🗴 = Holding time	breach ; ✓ = Withi	in holding tim		
Method		Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020				08-Aug-2020	11-Aug-2020	✓
DS Tauwitchere,	Mark Point							
Clear Plastic Bottle - Natural (EA015H)								
Stony Well,	North Jacks Point,	05-Aug-2020				08-Aug-2020	12-Aug-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020				07-Aug-2020	06-Aug-2020	×
DS Tauwitchere,	Mark Point							
Clear Plastic Bottle - Natural (EA045)								
Stony Well,	North Jacks Point,	05-Aug-2020				07-Aug-2020	07-Aug-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020				07-Aug-2020	18-Aug-2020	✓
DS Tauwitchere,	Mark Point							
Clear Plastic Bottle - Natural (ED037-P)								
Stony Well,	North Jacks Point,	05-Aug-2020				07-Aug-2020	19-Aug-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								

Page : 4 of 11 Work Order : EM2013637

Client : Dept for Environment & Water



Matrix: WATER	Evaluation: ▼ = Holding time breach ; ✓ = Within hold							
Method		Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020				07-Aug-2020	01-Sep-2020	✓
DS Tauwitchere,	Mark Point							
Clear Plastic Bottle - Natural (ED045G)								
Stony Well,	North Jacks Point,	05-Aug-2020				07-Aug-2020	02-Sep-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								
EG052G: Silica by Discrete Analyser								
Clear Plastic Bottle - Natural (EG052G)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020				10-Aug-2020	01-Sep-2020	✓
DS Tauwitchere,	Mark Point					_		,
Clear Plastic Bottle - Natural (EG052G)								
Stony Well,	North Jacks Point,	05-Aug-2020				10-Aug-2020	02-Sep-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							,
Morella Creek @ gauge,	Salt Creek Outlet.							
1.8km west of Salt Creek.	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa	ranka ront,							
	One Western							
EK055G-SW: Ammonia as N by Discrete Analyser in Clear Plastic Bottle - Sulfuric Acid (EK055G-SW)	i Sea Water		l					
Murray Mouth,	US Tauwitchere,	04-Aug-2020				10-Aug-2020	01-Sep-2020	1
DS Tauwitchere,	Mark Point	04 Aug 2020				To Aug 2020	0 : COP 2020	Y
Clear Plastic Bottle - Sulfuric Acid (EK055G-SW)	Wark Foliit							
Stony Well,	North Jacks Point,	05-Aug-2020				10-Aug-2020	02-Sep-2020	1
South Policeman Point/Seagull Island,	Snipe Point,	33 3 3 3 3 3 3						,
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,								
· · · · · · · · · · · · · · · · · · ·	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								

Page : 5 of 11 Work Order : EM2013637

Client : Dept for Environment & Water



	Sample Date	Ex	traction / Preparation			Analysis	
					Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
US Tauwitchere,	04-Aug-2020				06-Aug-2020	06-Aug-2020	✓
Mark Point							
North Jacks Point,	05-Aug-2020				07-Aug-2020	07-Aug-2020	✓
Snipe Point,							
Salt Creek Outlet,							
3.2km south of Salt Creek (land),							
Long Point,							
Bonneys,							
Parnka Point,							
nalvser							
,							
US Tauwitchere,	04-Aug-2020				07-Aug-2020	01-Sep-2020	✓
Mark Point							
North Jacks Point,	05-Aug-2020				07-Aug-2020	02-Sep-2020	✓
Snipe Point,							
Salt Creek Outlet,							
3.2km south of Salt Creek (land),							
Long Point,							
Bonneys,							
Parnka Point,							
	I						
US Tauwitchere,	04-Aug-2020	10-Aug-2020	01-Sep-2020	1	10-Aug-2020	01-Sep-2020	✓
Mark Point							
North Jacks Point,	05-Aug-2020	10-Aug-2020	02-Sep-2020	1	10-Aug-2020	02-Sep-2020	✓
Snipe Point,							
Salt Creek Outlet,							
3.2km south of Salt Creek (land),							
-							
Parnka Point,							
· •							
	Mark Point North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, US Tauwitchere, Mark Point North Jacks Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, US Tauwitchere, Mark Point North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys,	Mark Point North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point VS Tauwitchere, Mark Point US Tauwitchere, Mark Point US Tauwitchere, Mark Point US Tauwitchere, Mark Point, Bonneys, Parnka Point, US Tauwitchere, Mark Point O4-Aug-2020 O5-Aug-2020 O5-Aug-2020 O5-Aug-2020 O5-Aug-2020 O5-Aug-2020 O5-Aug-2020 O5-Aug-2020	Mark Point North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, US Tauwitchere, Mark Point US Tauwitchere, Mark Point US Tauwitchere, Mark Point, US Tauwitchere, Mark Point, O5-Aug-2020 10-Aug-2020 10-Aug-2020 10-Aug-2020 10-Aug-2020 10-Aug-2020 10-Aug-2020 10-Aug-2020 10-Aug-2020 10-Aug-2020 10-Aug-2020	Mark Point North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, US Tauwitchere, Mark Point North Jacks Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, North Jacks Point, Snipe Point, Snipe Point, Snipe Point, South of Salt Creek (land), Long Point, Bonneys, Parnka Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Snipe Point, S	Mark Point 05-Aug-2020	Mark Point North Jacks Point, Snipe Point, Salt Creek Outlet, 3.2km south of Salt Creek (land), Long Point, Bonneys, Parnka Point, US Tauwitchere, Mark Point Of-Aug-2020 Of-Au	Mark Point North Jacks Point, Snipe Point, Salt Creek (land), Long Point, Bonneys, Parmka Point US Tauwitchere, Mark Point US Taluwitchere, Salt Creek (land), Long Point, Someys, Parmka Point North Jacks Point, Snipe Point, Salt Creek (land), Long Point, Someys, Parmka Point, US Tauwitchere, Mark Point Of-Aug-2020 Of-Sep-2020 Of-Sep-2020 Of-Sep-2020 Of-Sep-2020 Of-Sep-2020 Of-Sep-2020 Of-Sep-2020 Of-Aug-2020 Of-Aug-2020 Of-Aug-2020 Of-Aug-2020 Of-Sep-2020 Of-Aug-2020 Of-Aug-2020 Of-Aug-2020 Of-Sep-2020 Of-Aug-2020 Of-Sep-2020 Of-Aug-2020 Of-Aug-2

Page : 6 of 11 Work Order : EM2013637

Client : Dept for Environment & Water



Matrix: WATER					Evaluation	ı: 🗴 = Holding time	breach ; ✓ = Withi	in holding tim
Method		Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyse	er .							
Clear Plastic Bottle - Sulfuric Acid (EK067G)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020	10-Aug-2020	01-Sep-2020	✓	10-Aug-2020	01-Sep-2020	✓
DS Tauwitchere,	Mark Point							
Clear Plastic Bottle - Sulfuric Acid (EK067G)								
Stony Well,	North Jacks Point,	05-Aug-2020	10-Aug-2020	02-Sep-2020	✓	10-Aug-2020	02-Sep-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								
EK071G: Reactive Phosphorus as P by discrete anal	vser							
Clear Plastic Bottle - Natural (EK071G)	,							
Murray Mouth,	US Tauwitchere,	04-Aug-2020				06-Aug-2020	06-Aug-2020	1
DS Tauwitchere,	Mark Point							'
Clear Plastic Bottle - Natural (EK071G)								
Stony Well,	North Jacks Point,	05-Aug-2020				07-Aug-2020	07-Aug-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								
EP002: Dissolved Organic Carbon (DOC)								1
Amber DOC Filtered- Sulfuric Preserved (EP002)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020				07-Aug-2020	01-Sep-2020	✓
DS Tauwitchere,	Mark Point							,
Amber DOC Filtered- Sulfuric Preserved (EP002)								
Stony Well,	North Jacks Point,	05-Aug-2020				07-Aug-2020	02-Sep-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								

Page : 7 of 11 Work Order : EM2013637

Client : Dept for Environment & Water



Matrix: WATER Evaluation:							n holding time	
Method		Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid (EP005)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020				07-Aug-2020	01-Sep-2020	✓
DS Tauwitchere,	Mark Point							
Amber TOC Vial - Sulfuric Acid (EP005)								
Stony Well,	North Jacks Point,	05-Aug-2020				07-Aug-2020	02-Sep-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								
EP008: Chlorophyll								
Glass Fibre Filter Paper (Chlorophyll) (EP008B)								
Murray Mouth,	US Tauwitchere,	04-Aug-2020				12-Aug-2020	25-Aug-2020	✓
DS Tauwitchere,	Mark Point							
Glass Fibre Filter Paper (Chlorophyll) (EP008B)								
Stony Well,	North Jacks Point,	05-Aug-2020				12-Aug-2020	26-Aug-2020	✓
South Policeman Point/Seagull Island,	Snipe Point,							
Morella Creek @ gauge,	Salt Creek Outlet,							
1.8km west of Salt Creek,	3.2km south of Salt Creek (land),							
Tilley Swamp Drain U/S Morella,	Long Point,							
Noonameena,	Bonneys,							
McGrath Flat North,	Parnka Point,							
Villa de Yumpa								

Page : 8 of 11 Work Order : EM2013637

Client : Dept for Environment & Water

Project : HCHI



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: WATER

Evaluation: * = Quality Control frequency not within specification: * = Quality Control frequency within specification.

Matrix: WATER				Evaluatio	n: × = Quality Co	ntrol frequency r	not within specification; ✓ = Quality Control frequency within specification.
Quality Control Sample Type		Сс	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N (Saline Water)	EK055G-SW	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	34	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a, b and c	EP008B	0	19	0.00	10.00	3c	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	37	10.81	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N (Saline Water)	EK055G-SW	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	34	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a, b and c	EP008B	0	19	0.00	5.00	3£	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N (Saline Water)	EK055G-SW	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	34	5.88	5.00	√	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	19	5.26	5.00	√	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a, b and c	EP008B	1	19	5.26	5.00	√	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	19	5.26	5.00	√	NEPM 2013 B3 & ALS QC Standard
·							•

Page : 9 of 11 Work Order : EM2013637

Client : Dept for Environment & Water



Matrix: WATER				Evaluatio	n: × = Quality Co	ontrol frequency	not within specification; ✓ = Quality Control frequency within specification.
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	ОC	Regular	Actual	Expected	Evaluation	
Method Blanks (MB) - Continued							
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N (Saline Water)	EK055G-SW	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	34	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Organic Carbon	EP002	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Silica (Reactive) by Discrete Analyser	EG052G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Page : 10 of 11 Work Order : EM2013637

Client : Dept for Environment & Water

Project : HCHE



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Algal Count	BM010	WATER	Specialist microbiological analysis subcontracted to ALS Scoresby (NATA Accredited Laboratory No. 992).
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of 'filterable' residue
			in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is
			evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM Schedule
			B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC
			Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule
			B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 CI - G.The thiocyanate ion is liberated from mercuric thiocyanate through
			sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions
			the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2
			017-1-L
Silica (Reactive) by Discrete Analyser	EG052G	WATER	In house: Referenced to APHA 4500-SiO2 D: Under Acdic conditions reactive silicon combines with ammonium
			molybdate to form a yellow molybdosilicic acid complex. This is reduced by 1-amino-2-naphthol-4-sulfonic acid
			to a silicomolybdenum blue complex which is measured by discrete analyser at 670 nm. This method is
A	=	NA/ATED	compliant with NEPM Schedule B(3).
Ammonia as N (Saline Water)	EK055G-SW	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser.
Nitrita and Inc. Discrete Applican	F140F70	NA/ATED	This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser.
Nitrata as N by Discrete Analyses	EKOEOO	WATER	This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed
			by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate
Nitrita and Nitrata and NOOO but Disposed	EKOEOO	WATER	calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by
Analyser			Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM
Total Kieldehl Nitregen es N. D., Diserete	EK061G	WATER	Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete	ENUOIG	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high
Analyser			temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen ee N. /TI/N. I. New) Dv	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3 This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	ENUOZG	WAILK	in house. Referenced to Ar FIA 4500-Norg / 4500-No.5 This method is compliant with NET in ochequie b(5)
Total Phosphorus as P By Discrete	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid
Analyser	LNOOTG	WAILK	digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with
Allalysel			ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its
			concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
			Concentration measured at coordinationing discrete analyses. This method is compilate with NET in Schedule B(3)

Page : 11 of 11 Work Order : EM2013637

Client : Dept for Environment & Water



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Dissolved Organic Carbon	EP002	WATER	In house: Referenced to APHA 5310 B. This method is compliant with NEPM Schedule B(3). Samples are combusted at high termperature in the presence of an oxidative catalyst. The evolved carbon dioxide is quantified using an IR detector.
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
Chlorophyll a, b and c	EP008B	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The trichromatic method is used by determining the optical density of the extract at 664 nm, 647nm and 630 nm spectrometrically.
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)