



EM&A Report

# SkyCity Nine Eagles Golf Course

## Quarterly EM&A Compliance Report


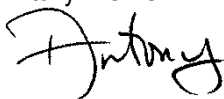
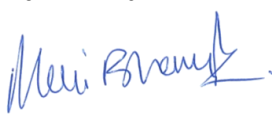
November 2011 to January 2012



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## CONTENTS

	<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1</b>	<b>PROJECT DESCRIPTION.....</b>	<b>1-1</b>
1.1	Overview.....	1-1
1.2	Operation.....	1-1
<b>2</b>	<b>LAKE WATER QUALITY EM&amp;A.....</b>	<b>2-1</b>
2.1	EM&A Programme .....	2-1
2.1.1	Monitoring This Quarter.....	2-1
2.1.2	Monitoring Next Quarter .....	2-1
2.2	Equipment and Methodology .....	2-1
2.3	Maintenance and Calibration .....	2-2
2.4	Parameters Monitored.....	2-2
2.5	Monitoring Locations .....	2-2
2.6	Monitoring Date, Time, Frequency and Duration .....	2-2
2.7	Action / Limit Levels .....	2-3
<b>3</b>	<b>MONITORING RESULTS .....</b>	<b>3-1</b>
3.1	Summary of Results .....	3-1
3.2	Discussion .....	3-2
3.2.1	November 2011 .....	3-2
3.2.2	December 2011 .....	3-2
3.2.3	January 2012.....	3-2
3.3	Operational Practice.....	3-3
3.4	Complaints and Notifications of Summons .....	3-1
3.4.1	Complaints Register .....	3-1
3.4.2	Notification of Summons .....	3-2
<b>4</b>	<b>COMMENTS, RECOMMENDATIONS AND CONCLUSIONS.....</b>	<b>4-1</b>

## APPENDICES

Appendix 1	Equipment Calibration Details
Appendix 2	Lake Water Quality Monitoring Data
Appendix 3	Graphical Plots of Monitoring Data for the Past Four Months
Appendix 4	Aqua Bio-Trol Liquid – Product Datasheet

## TABLES

Table 2-1	Monitoring Schedule for This Quarter
Table 2-2	Monitoring Schedule for the Next Quarter
Table 2-3	In-situ Monitoring Equipment Details
Table 2-4	Monitoring Frequency
Table 2-5	Action and Limit Levels for Lake Water Quality
Table 2-6	E/AP for Lake Water Quality Monitoring
Table 3-1	Summary of Compliance Monitoring Data during Reporting Quarter
Table 3-2	Operational Results

## FIGURES

Figure 1-1	Location of SkyCity Golf Course on the Airport Island
Figure 1-2	Schematic of Lake Water Control System
Figure 2-1	Locations for Lake Water Quality Monitoring
Figure 3-1	Predicted Night-time View from Seaview Crescent, Tung Chung (Excerpt from Figure 3-3 of the Project Profile, July 2005)
Figure 3-2	Actual Night-time View from Tung Chung, October 2011
Figure 3-3	Angle of Typical Floodlight After Re-positioning, 25 November 2011
Figure 3-4	Floodlights Pointing Towards the Golf Course, Away from Tung Chung, 25 November 2011
Figure 3-5	Actual Night-time View from Tung Chung, After Re-positioning of Floodlights, 13 November 2011

## 1 EXECUTIVE SUMMARY

The purpose of this Project is to construct and operate a 9-hole Golf Course at the east side of the North Commercial District (NCD) on the Airport Island as an interim arrangement prior to the area's future development as a business park. The interim golf facility, known as "SkyCity Nine Eagles Golf Course" is intended to serve airport passengers, overseas visitors and airport workers until August 2013.

According to the approved EM&A Manual, monthly compliance monitoring of lake water quality at four locations (W1 and W2 in Lake A and W3 and W4 in Lake B) is required during the second phase of the Operation Period, with reporting on a quarterly basis. Parameters monitored comprise Suspended Solids (SS), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD<sub>5</sub>), nitrogen, phosphorous, temperature and salinity.

This is the nineteenth Quarterly Compliance report covering November 2011 to January 2012 and complies with the reporting requirements stated in the approved EM&A Manual.

In November 2011, there were exceedances of Limit Level for SS at all four locations. Compared to the previous month, the SS levels in Lake A were lower, although the SS levels in Lake B were higher. There were no exceedances of any other parameters. Total nitrogen and total phosphorous concentrations remained below Action Levels, which indicate that application of organic nutrients is NOT the cause of the exceedances.

In December 2011, there were exceedances of Limit Level for SS at all four locations. Compared to the previous month, all SS levels were lower. There were no exceedances of any other parameters. Total nitrogen and total phosphorous concentrations remained below Action Levels, which indicate that application of organic nutrients is NOT the cause of the exceedances.

In January 2012, there were exceedances of Action Level for SS at W1 and W2 and exceedance of Limit Level for SS at W3 and W4. Compared to the previous month, SS levels at all monitoring locations especially W1 and W2 are lower. There were no exceedances of any other parameters. Total nitrogen and total phosphorous concentrations remained below Action Levels, which indicate that application of organic nutrients is NOT the cause of the exceedances.

Based on observations, the exceedances of Limit Level for SS in the reporting quarter were again due to the continued presence of algae in the water, albeit reducing as the water temperature drops. Lake water volume continues to be a problem, with rainfall significantly lower compared to last year. The lake levels are therefore extremely low, which has increased the algae concentration. Bio-Trol has is being applied each month in an attempt to control the algal growth. Combined with the cooler weather, algal growth will hopefully be reduced in the next quarter.

As soon as monthly results were available, EPD and the Golf Course Supervisor were notified of any exceedances, as required by the Event/Action Plan. Furthermore, the Golf Course Supervisor was also advised whether the lake water was or was not of an acceptable quality for discharge and whether the control valve could be opened or not.

Regarding complaint related to night-time glare from the floodlights received in previous quarter, the Golf Course Supervisor adjusted angle of floodlights in order to direct floodlights toward the golf course. No further concerns were received from the complainant or EPD. Based on the reduction of glare achieved by the re-positioning of

the floodlights in November 2011, in response to the complaint, it is considered that the concerns of the complainant and of EPD have been addressed. This complaint is therefore considered to be closed-out.

There were no complaints, notifications of summons received during the reporting quarter. There were also no openings of the control valve, emergency or otherwise. As such, there was no off-site release of lake water and therefore no impact to the marine environment.

# 1 PROJECT DESCRIPTION

## 1.1 Overview

The purpose of this Project is to construct and operate a 9-hole Golf Course at the east side of the North Commercial District (NCD) on the Airport Island as an interim arrangement prior to the area's future development as a business park (see *Figure 1-1*). The interim golf facility, known as "SkyCity Nine Eagles Golf Course" is intended to serve airport passengers, overseas visitors and airport workers until August 2013.

The Project is managed by SkyCity Nine Eagles Golf Course, who has engaged Asia Turf Solutions Ltd. to establish and maintain the turfgrass of the Golf Course. SMEC Asia Ltd have been employed as the Environmental Team (ET) for the Operation Period since May 2010 and have engaged ALS Technichem Pty Ltd as the HOKLAS accredited testing laboratory to carry out lake water analysis. Construction was completed on 31 December 2006, the first phase of the Operation Period was completed on 30 April 2007, and the second phase commenced on 1 May 2007.

## 1.2 Operation

The Golf Course has been designed to contain water within two artificial lakes, which are linked together by two underwater pipes. The lakes provide a source of freshwater for irrigation. All rainwater and surplus irrigation water collected within the Golf Course will drain back into the lakes for reuse, through a sub-soil drainage system.

The lakes are maintained at a capacity of 15,000m<sup>3</sup>. This is not "full" but is the level that provides the required visual appearance. During the winter (dry) months, however, the lake water may fall below this level. The maximum capacity of the lakes is 20,000m<sup>3</sup>.

If the capacity of the lakes exceeds 20,000m<sup>3</sup>, then the Golf Course may flood. To avoid this, the Golf Course Supervisor can authorise the opening of a control valve to allow the water to overflow from the lakes into storm drains that discharge off-site via Outfall No. 8. However, the valve can only be opened if the lake water monitoring results indicate that water is of an acceptable quality. Under normal circumstances, the control valve remains closed and discharge off-site is not possible. All opening/closing of the control valve is logged on site.

If the latest lake water monitoring results indicate that water is not of an acceptable quality, then the valve cannot be opened, the lake water cannot overflow and the Golf Course may begin to flood. This is part of the mitigation design to prevent off-site discharge of water that does not meet the required standard.

The bund that surrounds the site is at least 1.5m high and up to 90,000m<sup>3</sup> of floodwater can be retained within the Golf Course in addition to the 20,000m<sup>3</sup> lake capacity. In this situation, water samples from the flooded Golf Course will be taken more frequently. Only when water has returned to an acceptable quality will the control valve be opened to allow water to overflow from the lake and into off-site storm drains that discharge via Outfall No. 8, thereby allowing the flood to recede.

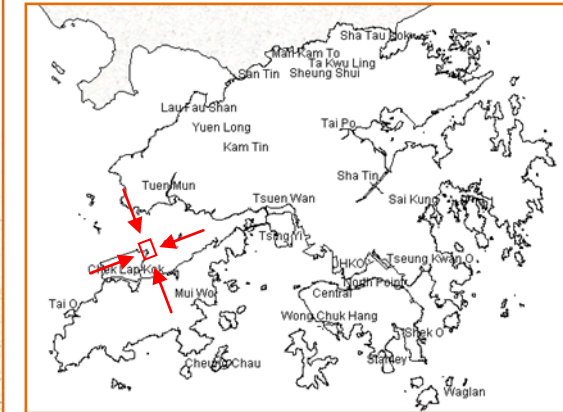
The system by which this water control is achieved is shown in *Figure 1-2*.

**Figure 1-1 Location of SkyCity Golf Course on the Airport Island**



Source: Image courtesy of Airport Authority

**Location Map**

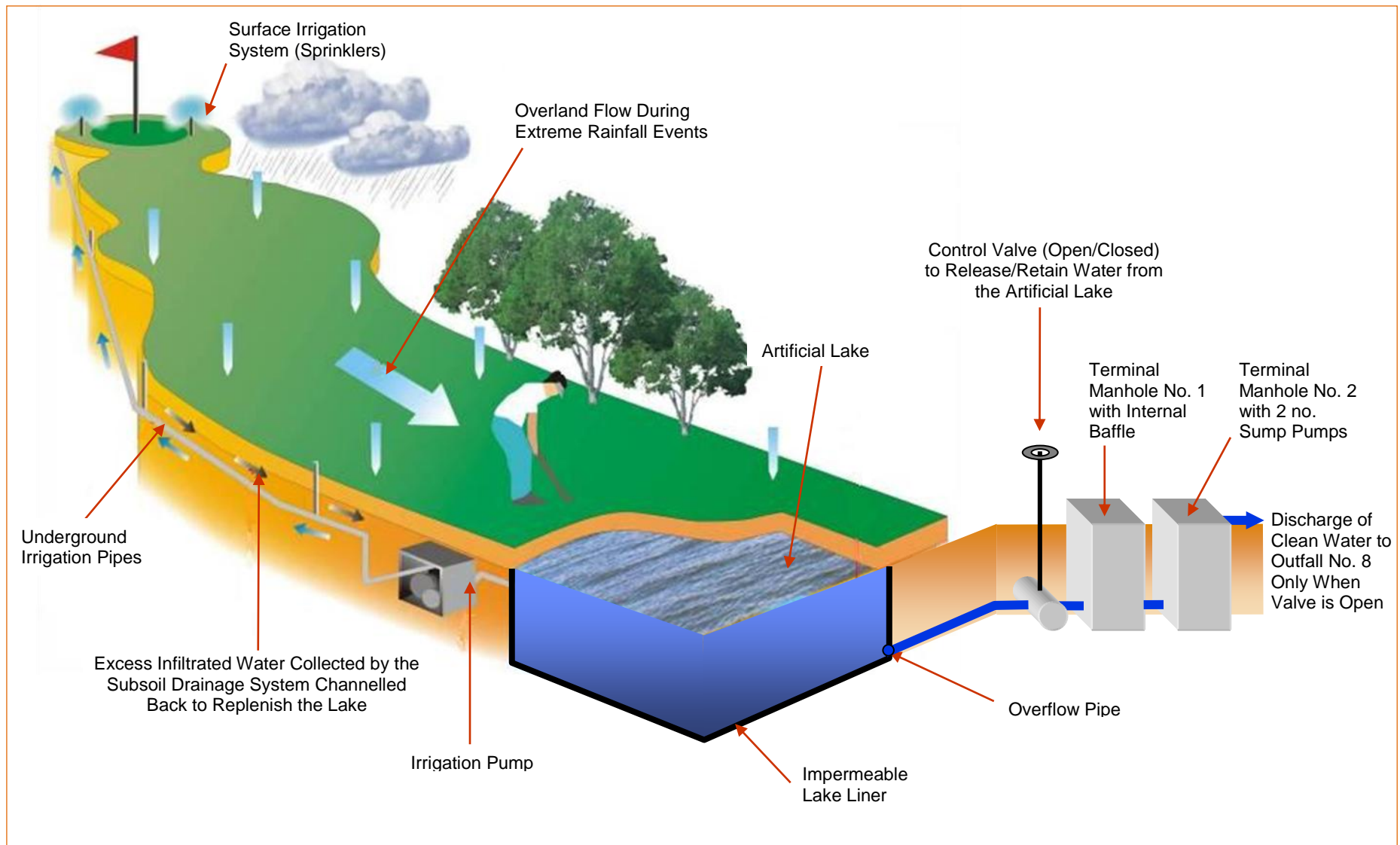


**Key**

- 1 Terminal 2 & SkyPlaza  
(Retail, F&B & Entertainment)  
二號客運大樓及翔天廊 (零售、食肆及娛樂區)
- 2 HKIA Tower  
機場行政大樓
- 3 AsiaWorld - Expo  
亞洲國際博覽館
- 4 2nd on-airport hotel  
第二間機場酒店
- 5 SkyPier  
海天客運碼頭
- 6 SkyCity Nine Eagles Golf Course  
航天城高爾夫球場
- 7 Airport World Trade Centre  
暫名: 機場世界貿易中心



Figure 1-2 Schematic of Lake Water Control System



## 2 LAKE WATER QUALITY EM&A

### 2.1 EM&A Programme

Monitoring of Dissolved Oxygen (DO) in mg/l, Suspended Solids (SS) in mg/l, Biochemical Oxygen Demand (BOD<sub>5</sub>) in mg/l, Total Nitrogen in mg/l, Total Phosphorous in mg/l, Salinity in g/l, and temperature in °C was carried out by the ET to ensure that any deterioration in lake water quality could be readily detected and timely action could be taken to rectify the situation if this was due to site operations.

DO, temperature and salinity were measured in-situ whilst other parameters were determined in a HOKLAS-accredited laboratory.

#### 2.1.1 Monitoring This Quarter

The actual lake water monitoring schedule for this quarter (November 2011 to January 2012) is given in **Table 2-1**, below.

**Table 2-1 Monitoring Schedule for This Quarter**

Sampling Date	Sampling Locations
11 Nov 2011	W1 to W4
9 Dec 2011	W1 to W4
13 Jan 2012	W1 to W4

#### 2.1.2 Monitoring Next Quarter

The planned lake water monitoring schedule for the next quarter (February to April 2012) is given in **Table 2-2**, below.

**Table 2-2 Monitoring Schedule for the Next Quarter**

Sampling Date	Sampling Locations
10 February 2012	W1 to W4
09 March 2012	W1 to W4
13 April 2012	W1 to W4

### 2.2 Equipment and Methodology

Because of the relatively shallow water, in-situ measurements and water sampling were conducted at 0.5m from the surface (the mid-point of the 1m deep lake). Water samples for all monitoring parameters were collected, stored, preserved and analysed according to *APHA Standard Methods for the Examination of Water and Wastewater, 19th Ed, #17*.

In-situ monitoring was carried out using a DO concentration and DO saturation were carried out using a YSI Model 85 CE-C-M-Y multi-parameter meter and the range, resolution and accuracy of the equipment is provided in **Table 2-3**.

**Table 2-3 In-situ Monitoring Equipment Details**

In-situ Parameters	Measuring Devices	Measurement Precision
Dissolved Oxygen	YSI Professional Plus	0.1mg/ℓ and 0.1%
Salinity		0.1ppt (or g/ℓ)
Temperature		0.1°C

A Kahlisco water sampler was used to obtain water samples for subsequent SS analysis in the laboratory. A sufficient volume of the sample is collected in clean, high density polythene bottles, packed in ice (cooled to 4°C without being frozen), and delivered to the ALS laboratory immediately after monitoring. The analysis of the collected samples starts by the next working day following APHA *Standard Methods* #2540D.

## 2.3 Maintenance and Calibration

All in-situ monitoring instruments are calibrated and certified by ALS at monthly intervals throughout all stages of the lake water quality monitoring programme.

The YSI Multi-purpose Meter is calibrated once per monitoring day by the wet bulb method. Calibration at the ALS laboratory is carried out once every month in a water sample of known dissolved oxygen concentration. The sensor is immersed in the water and after thermal equilibration, the known mg/ℓ value is keyed in and the calibration is carried out automatically. Calibration details are provided in **Appendix 1**.

## 2.4 Parameters Monitored

The following parameters are monitored and compared to Action/Limit (A/L) Levels:

- Dissolved Oxygen
- Suspended Solids
- BOD<sub>5</sub>
- Total Nitrogen
- Total Phosphorous

There are no A/L Levels for temperature or salinity – these parameters are recorded for information only.

## 2.5 Monitoring Locations

Monitoring locations together with grid references are shown in **Figure 2-1**. Monitoring Stations are designated as W1, W2, W3 and W4.

## 2.6 Monitoring Date, Time, Frequency and Duration

In accordance with the EM&A Manual, the monitoring frequency of lake water quality is shown as **Table 2-4**.

**Table 2-4 Monitoring Frequency**

	Operation Phase	
	Below A/L Level	A/L Level Exceedance
Monitoring Frequency	Monthly	Weekly

## 2.7 Action / Limit Levels

According to the approved EM&A manual, the A/L Levels for the compliance monitoring (for monitoring locations W1 to W4) are shown in **Table 2-5**, below.

**Table 2-5 Action and Limit Levels for Lake Water Quality**

Parameter	Acceptable Standard (mg/l)	
	Action Level	Limit Level
Suspended Solids	20	30
BOD <sub>5</sub>	13.5	20
Dissolved Oxygen	4	3
Total Nitrogen	20	30
Total Phosphorous	3.5	5

In case of exceedance of A/L Levels caused by the operation of the Golf Course, the ET shall immediately implement the Event/ Action Plan (E/AP), shown in **Table 2-6**, below, in order to resolve lake water quality problems:

**Table 2-6 E/AP for Lake Water Quality Monitoring**

Event	Action
Exceedance of Action Level	<ul style="list-style-type: none"> <li>Notify the Golf Course Supervisor of the exceedance, providing full details (time, location, parameter, level, etc.).</li> <li>Increase the frequency of monitoring of the particular parameter(s) to “Action/Limit Level Exceedance” as shown in <b>Table 2-4</b>.</li> <li>If water quality continues to worsen, it may be prudent to review the Turfgrass Management Plan (TMP) in terms of application of nutrients and agree any revisions with the Golf Facility Supervisor.</li> <li>Notify the Golf Facility Supervisor when water quality falls below “Action Level” and reduce monitoring frequency to “Below Action/Limit Level” as shown in <b>Table 2-4</b>.</li> </ul>
Exceedance of Limit Level	<ul style="list-style-type: none"> <li>Notify EPD and Golf Course Supervisor of the exceedance, providing full details (time, location, parameter, level, etc.).</li> <li>Suspend any ongoing application of organic nutrients.</li> <li>Determine the likely cause of the exceedance(s). Review the TMP in terms of application of nutrients and agree any revisions with the Golf Facility Supervisor. Continue to irrigate the Golf Course using lake water.</li> <li>Increase the frequency of monitoring of the particular parameter(s) to “Action/Limit Level Exceedance” as shown in <b>Table 2-4</b>. (if not already at this frequency) to demonstrate the effectiveness of remedial measures and to confirm that water quality has returned to acceptable levels.</li> <li>Notify EPD and Golf Course Supervisor when water quality falls below “Action Level” (not “Limit Level”) and reduce monitoring frequency to “Below Action/Limit Level” as shown in <b>Table 2-4</b>.</li> </ul>

**Figure 2-1** Locations for Lake Water Quality Monitoring



## 3 MONITORING RESULTS

### 3.1 Summary of Results

A summary of scheduled lake water monitoring results for the reporting quarter is provided in **Table 3-1**, below. Detailed results are provided in **Appendix 2** and graphical plots since commencement of the second phase of Operation are given in **Appendix 3**.

**Table 3-1 Summary of Compliance Monitoring Data During Reporting Quarter**

Monitoring Location		Salinity (g/ℓ)	Temperature (°C)	SS (mg/ℓ)	BOD <sub>5</sub> (mg/ℓ)	DO Saturation (%age)	DO Concentration (mg/ℓ)	Total Nitrogen (mg/ℓ)	Total Phosphorous (mg/ℓ)
W1	Mean	0.1	18.4	<b>42.3</b>	2.3	93.1	8.7	1.8	0.1
	Minimum	0.1	15.9	<b>27.0</b>	2.0	84.0	7.8	1.5	0.1
	Maximum	0.2	20.6	<b>51.0</b>	3.0	99.3	9.8	2.3	0.2
W2	Mean	0.1	18.2	<b>41.0</b>	2.3	92.6	8.7	1.6	0.1
	Minimum	0.1	15.8	<b>26.0</b>	2.0	83.0	7.8	1.4	0.1
	Maximum	0.2	20.5	<b>50.0</b>	3.0	102.0	10.1	1.9	0.2
W3	Mean	0.2	18.0	<b>54.0</b>	6.7	93.7	8.9	3.0	0.1
	Minimum	0.2	15.3	<b>44.0</b>	6.0	79.2	7.5	2.1	0.1
	Maximum	0.3	20.5	<b>70.0</b>	8.0	102.0	10.2	4.8	0.2
W4	Mean	0.2	17.8	<b>56.3</b>	7.7	91.9	8.8	3.2	0.2
	Minimum	0.2	15.3	<b>43.0</b>	7.0	78.0	7.4	2.1	0.1
	Maximum	0.3	20.4	<b>80.0</b>	8.0	108.0	10.8	4.9	0.3

**Note:** **Bold** indicates Action Level exceedance; **Bold** indicates **Limit Level** exceedance

As can be seen from the above summary, during the reporting quarter, there were a number of exceedances of the Action Level and Limit Level for SS and BOD<sub>5</sub>.

As soon as monthly results were available, EPD and the Golf Course Supervisor were notified of any exceedances, as required by the Event/Action Plan. Furthermore, the Golf Course Supervisor was also advised whether the lake water was or was not of an acceptable quality for discharge and whether the control valve could be opened or not.

It was not considered necessary to carry out follow-up monitoring, nor to increase the sampling frequency – this is discussed below, based on the data in **Appendix 2**.

## 3.2 Discussion

### 3.2.1 November 2011

In November, there were exceedances of Limit Level for SS at all monitoring locations. There was no exceedance of any other parameters, Therefore, in accordance with the EM&A Manual, the Golf Facility Supervisor was advised that the control valve shall remain closed and there shall be no discharge off-site into the surrounding marine waters until such time as lake water has returned to an acceptable quality.

Compared to the previous month, the SS levels in Lake A were lower, although the SS levels in Lake B were higher. Based on observation, the exceedances were considered to be due to the continued presence of algae in the water. Water loss has been a problem, with rainfall during the quarter down 60% compared to last year. The lake levels are therefore extremely low, which has further increased the algae concentration.

While the SS level was high, both nitrogen and phosphorous concentrations were well below their respective Action Levels, which indicates that the algae was not caused by accumulation of excessive nutrients from fertilizer use on the Golf Course. Bio-Trol has is being applied each month in an attempt to control the algal growth.

As the reason for the exceedance is understood, it is not considered necessary to increase frequency of monitoring at this time. Since the application of organic nutrients is not the cause of the exceedance, there is no need to suspend application of organic nutrients, to review the TMP, or remedial measures in terms of turfgrass management.

While the water quality in the lakes remains below acceptable levels for discharge it should be noted that there has been no discharge off-site and so there have been no adverse environmental impacts to the surrounding marine environment.

### 3.2.2 December 2011

In December, there were exceedances of Limit Level for SS at all monitoring locations. There was no exceedance of any other parameters, Therefore, in accordance with the EM&A Manual, the Golf Facility Supervisor was advised that the control valve shall remain closed and there shall be no discharge off-site into the surrounding marine waters until such time as lake water has returned to an acceptable quality.

Compared to the previous month, all SS levels were lower. Based on observation, the exceedances were considered to be due to the continued presence of algae in the water. Water loss has been a problem, with rainfall during the quarter down 60% compared to last year. The lake levels are therefore extremely low, which has further increased the algae concentration.

While the SS level was high, both nitrogen and phosphorous concentrations were well below their respective Action Levels, which indicates that the algae was not caused by accumulation of excessive nutrients from fertilizer use on the Golf Course. Bio-Trol has is being applied each month in an attempt to control the algal growth.

As the reason for the exceedance is understood, it is not considered necessary to increase frequency of monitoring at this time. Since the application of organic nutrients is not the cause of the exceedance, there is no need to suspend application of organic nutrients, to review the TMP, or remedial measures in terms of turfgrass management.

While the water quality in the lakes remains below acceptable levels for discharge it should be noted that there has been no discharge off-site and so there have been no adverse environmental impacts to the surrounding marine environment.

### 3.2.3 January 2012

In January, there were exceedances of Action level for SS at W1 and W2 and exceedances of Limit Level for SS at W3 and W4. There was no exceedance of any other parameters, Therefore, in accordance with the EM&A Manual, the Golf Facility Supervisor was advised that the control valve shall remain closed and there shall be no discharge off-site into the surrounding marine waters until such time as lake water has returned to an acceptable quality.

Compared to the previous month, SS levels at all monitoring locations especially W1 and W2 are lower. Based on observation, the exceedances were considered to be due to the continued presence of algae in the water. . Lake water volume continues to be a problem, with rainfall significantly lower compared to last year. The lake levels are therefore extremely low, which has increased the algae concentration.

While the SS level was high, both nitrogen and phosphorous concentrations were well below their respective Action Levels, which indicates that the algae was not caused by accumulation of excessive nutrients from fertilizer use on the Golf Course. Bio-Trol has is being applied each month in an attempt to control the algal growth.

As the reason for the exceedance is understood, it is not considered necessary to increase frequency of monitoring at this time. Since the application of organic nutrients is not the cause of the exceedance, there is no need to suspend application of organic nutrients, to review the TMP, or remedial measures in terms of turfgrass management.

While the water quality in the lakes remains below acceptable levels for discharge it should be noted that there has been no discharge off-site and so there have been no adverse environmental impacts to the surrounding marine environment.

## 3.3 Operational Practice

**Table 3-2**, below, shows the operational practice during the reporting quarter, i.e., the activities relating to the management of water in the lakes. Because lake water was not considered to be of an acceptable quality from November 2011 to January 2012, the control valve had to remain closed.

**Table 3-2 Operational Results**

Month	Month-end Lake Water Depth (m)	Can Control Valve Be Opened?	Was Control Valve Opened?	Quantity of Water Discharged (m <sup>3</sup> )
November 2011	0.9	No	No	0
December 2011	0.9	No	No	0
January 2012	1.0	No	No	0



## 3.4 Complaints and Notifications of Summons

### 3.4.1 Complaints Register

#### Previous Quarter

During the previous reporting quarter a complaint was received from a Tung Chung resident relating to night-time glare from the floodlights at Nine Eagles. Details are:

Topic of Complaint : Light pollution from floodlights  
Location of Complainant : Tung Chung  
Date of Complaint : September 2011  
Complaint Made to : EPD

After receiving the complaint, EPD informed the Project Proponent verbally on 22 September and in writing on 3 October 2011. EPD followed-up the complaint with the Project Proponent verbally on 17 October and in writing on 26 October. The Project Proponent informed the ET verbally and in writing on 26 October. The above is considered to be in compliance with the initial part of the complaints handling procedure outlined in the EM&A Manual.

In terms of the operation of the floodlights, the following are relevant:

- Special Conditions clause 2.9 of Environmental Permit (EP) for the project states: *"Floodlights shall be installed at an angle downwards away from the sensitive receivers including air traffic controllers in the Airport Traffic Control Tower"*
- Section 5.7.2 of the Golf Course Revised Project Profile (which forms part of the EP) states: *".....glare will be avoided by appropriate angling the floodlights onto the course and away from North Lantau New Town and by fixing of visors/louvers to the flood lights to prevent "spillage"....."*

EPD carried out further investigations on the alleged light pollution from Nine Eagles Golf Course at Tung Chung New Town and found *"... the lighting of the golf course is the foremost source of glare on the airport island on Tung Chung residential premises"*. The Project Proponent also carried out his own investigation of the alleged light pollution.

**Figure 3-1**, below, is extracted from the Project Profile and is a photomontage showing the anticipated light pollution from Nine Eagles Golf Course when viewed from Tung Chung. **Figure 3-2**, is a photograph taken by the Project Proponent in October 2011 after the complaint was received.

It can be seen that the actual glare from Nine Eagles Golf Course is no too dissimilar from that which was predicted in the Project Profile on which basis the EP was issued. Nevertheless, the Project Proponent intends to address this complaint as follows:

1. Arrange a night-time visit to Tung Chung with EPD and with the ET;
2. Take additional photographic evidence of the alleged light pollution and identify which floodlights are in question;
3. Return to Nine Eagles Golf Course and examine the floodlights in question to determine whether they are sufficiently angled downwards; and

4. If it is considered that the floodlights are responsible for the glare, and the complaint is validated, then the Project Proponent will consider further angling the floodlights downwards and/or install new or additional visors/louvers to further minimise light “spillage”

### **This Quarter**

On 25 November 2011 a night-time inspection of the floodlighting was arranged. Representatives from SkyCity Nine Eagles Golf Course, the ET and EPD’s Local Control Office attended.

Prior to this inspection, earlier in November, SkyCity Nine Eagles Golf Course had carried out maintenance work to re-position the floodlights to point further downwards.

The group toured the golf course and noted the angle of the floodlighting and also the direction in which the lights were pointing. **Figure 3-3** shows the angle of a typical floodlighting stand (after re-positioning carried out in November) and it can be clearly seen that the floodlights are now angled further towards the golf course. **Figure 3-4** is a view from the golf course towards Tung Chung and clearly shows the floodlights pointing towards the golf course and away from Tung Chung.

**Figure 3-5**, is a photograph taken from Tung Chung towards Nine Eagles Golf Course by the Project Proponent on 13 November 2011, after the re-positioning of the floodlights. Compared to **Figure 3-2**, which was taken prior to the re-positioning, it can be seen that the glare from the floodlighting is less intense and more in line with that anticipated in the Project Profile, as shown in **Figure 3-1**.

Based on the reduction of glare achieved by the re-positioning of the floodlights in November 2011, in response to the complaint, it is considered that the concerns of the complainant and of EPD have been addressed. This complaint is therefore considered to be closed-out.

This complaints has been updated in accordance with the requirements of the EM&A Manual and when the complainant has been advised of the actions taken, the complaints handling procedure is deemed to have been completed in accordance with the requirements of the EM&A Manual.

### **3.4.2 Notification of Summons**

During the reporting quarter, there were no notifications of summons. There were also no openings of the control valve, emergency or otherwise.

**Figure 3-1** Predicted Night-time View from Seaview Crescent, Tung Chung (Excerpt from Figure 3-3 of the Project Profile, July 2005)



**Figure 3-2** Actual Night-time View from Tung Chung, October 2011



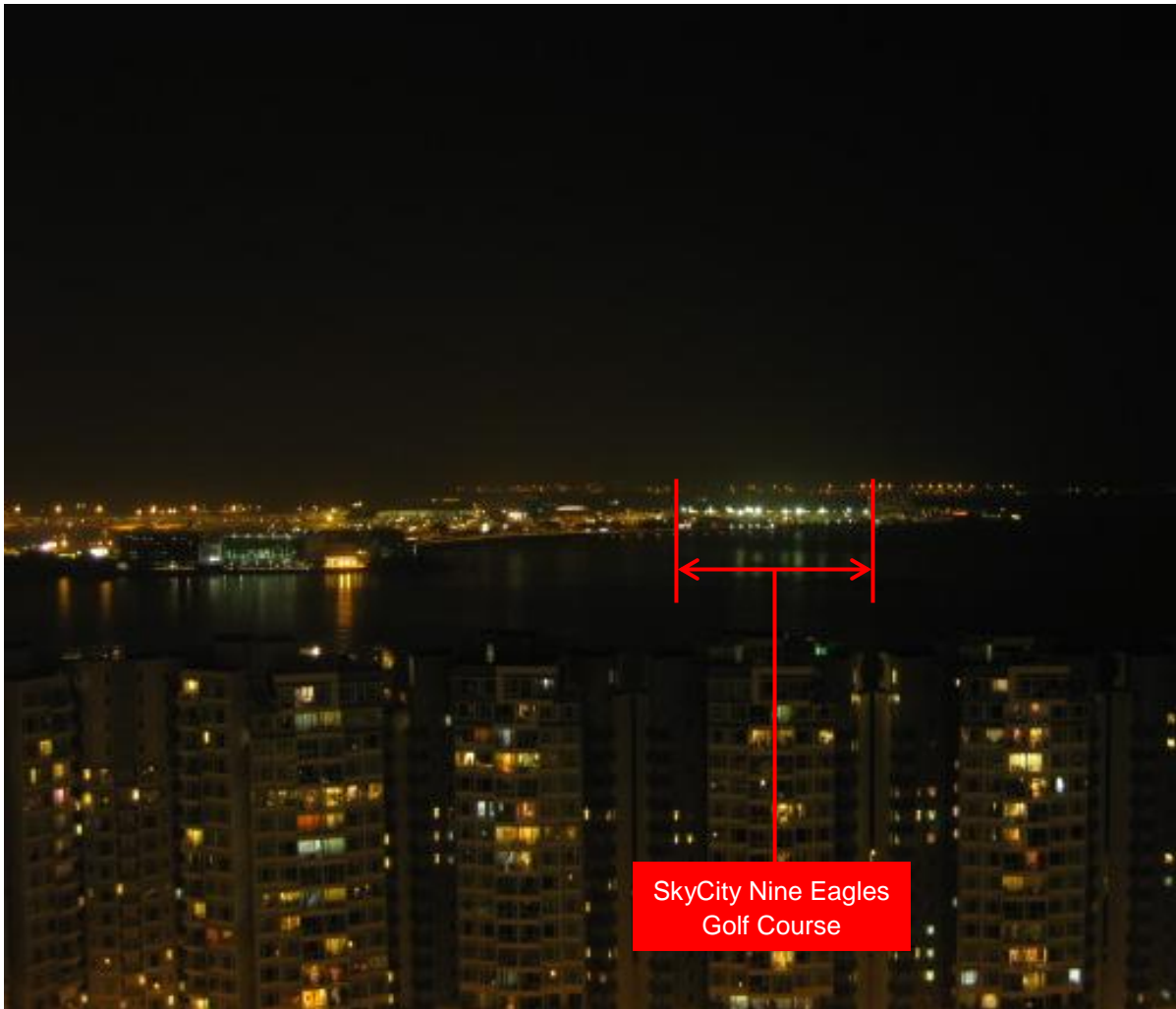
**Figure 3-3** Angle of Typical Floodlight After Re-positioning, 25 November 2011



**Figure 3-4** Floodlights Pointing Towards the Golf Course, Away from Tung Chung, 25 November 2011



**Figure 3-5** Actual Night-time View from Tung Chung, After Re-positioning of Floodlights, 13 November 2011



## 4 COMMENTS, RECOMMENDATIONS AND CONCLUSIONS

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Reporting during the second phase of the Operation Period is required on a quarterly basis. This is the nineteenth Quarterly Compliance report covering November 2011 to January 2012 and complies with the reporting requirements stated in the approved EM&A Manual.

Compliance monitoring of lake water quality is required on a monthly basis, with an increase in frequency to weekly if there are Action or Limit Levels exceedances caused by the operation of the Golf Course. Parameters tested include SS, DO, BOD<sub>5</sub>, nitrogen, phosphorous, temperature and salinity.

In November 2011, there were exceedances of Limit Level for SS at all four locations. Compared to the previous month, the SS levels in Lake A were lower, although the SS levels in Lake B were higher. There were no exceedances of any other parameters. Total nitrogen and total phosphorous concentrations remained below Action Levels, which indicate that application of organic nutrients is NOT the cause of the exceedances.

In December 2011, there were exceedances of Limit Level for SS at all four locations. Compared to the previous month, all SS levels were lower. There were no exceedances of any other parameters. Total nitrogen and total phosphorous concentrations remained below Action Levels, which indicate that application of organic nutrients is NOT the cause of the exceedances.

In January 2012, there were exceedances of Limit Level for SS at all four locations. Compared to the previous month, all SS levels were lower. There were no exceedances of any other parameters. Total nitrogen and total phosphorous concentrations remained below Action Levels, which indicate that application of organic nutrients is NOT the cause of the exceedances.

During the reporting quarter there were no complaints, and the complaint from the previous quarter was resolved and is now considered to be closed-out. There were no notifications of summons. There were also no openings of the control valve, emergency or otherwise. As such, there was no off-site release of lake water and therefore no impact to the marine environment.

---

## APPENDIX 1

### Equipment Calibration Details



**REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION**

**CONTACT:** MR ALEXI BHANJA  
**CLIENT:** SMEC ASIA LIMITED  
**ADDRESS:** 27/F, FORD GLORY PLAZA,  
37-39 WING HONG STREET,  
CHEUNG SHA WAN,  
KOWLOON, HONG KONG.  
**PROJECT:** SKY CITY GOLF COURSE

**WORK ORDER:** HK1126643  
**SUB-BATCH:** 1  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** --  
**DATE OF ISSUE:** 21/11/2011

**COMMENTS**

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.  
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

**Scope of Test:** Dissolved Oxygen and Temperature  
**Description:** YSI Multimeter  
**Brand Name:** YSI  
**Model No.:** YSI Professional Plus  
**Serial No.:** 10D101565  
**Equipment No.:** ENO 00  
**Date of Calibration:** 12 October, 2011

**NOTES**

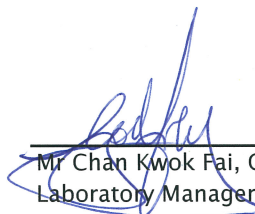
This is the Final Report and supersedes any preliminary report with this batch number.  
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

**ISSUING LABORATORY: HONG KONG**

**Address**

ALS Technichem (HK) Pty Ltd  
11/F Chung Shun Knitting Centre  
1-3 Wing Yip Street  
Kwai Chung  
HONG KONG

**Phone:** 852-2610 1044  
**Fax:** 852-2610 2021  
**Email:** [hongkong@alsglobal.com](mailto:hongkong@alsglobal.com)

  
Mr. Chan Kwok Fai, Godfrey  
Laboratory Manager – Hong Kong



# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1126643  
SUB-BATCH: 1  
Date of Issue: 21/11/2011  
Client: SMEC ASIA LIMITED



Description: YSI Multimeter  
Brand Name: YSI  
Model No.: YSI Professional Plus  
Serial No.: 10D101565  
Equipment No.: ENO 00  
Date of Calibration: 12 October, 2011

Date of next Calibration: 12 January, 2012

## Parameters:

### Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.15	4.31	0.16
6.30	6.35	0.05
7.90	8.06	0.16
	Tolerance Limit ( $\pm$ mg/L)	0.20

### Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading ( $^{\circ}$ C )	Displayed Reading ( $^{\circ}$ C )	Tolerance ( $^{\circ}$ C )
12.0	13.5	1.5
25.0	24.3	-0.7
36.5	37.0	0.5
	Tolerance Limit ( $^{\circ}$ C)	2.0

  
Mr Chan Kwok Fai, Godfrey  
Laboratory Manager - Hong Kong



**ALS Technichem (HK) Pty Ltd**

## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**CONTACT:** MR ALEXI BHANJA  
**CLIENT:** SMEC ASIA LIMITED  
**ADDRESS:** 27/F, FORD GLORY PLAZA,  
37-39 WING HONG STREET,  
CHEUNG SHA WAN,  
KOWLOON, HONG KONG.  
**PROJECT:** SKY CITY GOLF COURSE

**WORK ORDER:** HK1129140  
**SUB-BATCH:** 1  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** --  
**DATE OF ISSUE:** 12/12/2011

### COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.  
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

**Scope of Test:** Dissolved Oxygen and Temperature  
**Description:** YSI Multimeter  
**Brand Name:** YSI  
**Model No.:** YSI Professional Plus  
**Serial No.:** 10D101565  
**Equipment No.:** ENO 00  
**Date of Calibration:** 12 October, 2011

### NOTES

This is the Final Report and supersedes any preliminary report with this batch number.  
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

### ISSUING LABORATORY: HONG KONG

#### **Address**

ALS Technichem (HK) Pty Ltd  
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Kwai Chung  
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**Phone:** 852-2610 1044  
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**Email:** [hongkong@alsglobal.com](mailto:hongkong@alsglobal.com)

  
Mr Chan Kwok Fai, Godfrey  
Laboratory Manager - Hong Kong

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Page 1 of 2

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Environmental 

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# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1129140  
**SUB-BATCH:** 1  
**Date of Issue:** 12/12/2011  
**Client:** SMEC ASIA LIMITED



**Description:** YSI Multimeter  
**Brand Name:** YSI  
**Model No.:** YSI Professional Plus  
**Serial No.:** 10D101565  
**Equipment No.:** ENO 00  
**Date of Calibration:** 12 October, 2011      **Date of next Calibration:** 12 January, 2012

**Parameters:**

**Dissolved Oxygen**

**Method Ref: APHA (21st edition), 4500O: G**

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.15	4.31	0.16
6.30	6.35	0.05
7.90	8.06	0.16
	Tolerance Limit ( $\pm$ mg/L)	0.20

**Temperature**

**Method Ref: Section 6 of International Accreditation New Zealand Technical**

**Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
12.0	13.5	1.5
25.0	24.3	-0.7
36.5	37.0	0.5
	Tolerance Limit (°C)	2.0

  
 \_\_\_\_\_  
 Mr Chan Kwok Fai, Godfrey  
 Laboratory Manager - Hong Kong



**REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION**

**CONTACT:** MR ALEXI BHANJA  
**CLIENT:** SMEC ASIA LIMITED  
**ADDRESS:** 27/F, FORD GLORY PLAZA,  
37-39 WING HONG STREET,  
CHEUNG SHA WAN,  
KOWLOON, HONG KONG.  
**PROJECT:** SKY CITY GOLF COURSE

**WORK ORDER:** HK1201399  
**SUB-BATCH:** 1  
**LABORATORY:** HONG KONG  
**DATE RECEIVED:** --  
**DATE OF ISSUE:** 19/01/2012

**COMMENTS**

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.  
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Dissolved Oxygen and Temperature  
Description: YSI Multimeter  
Brand Name: YSI  
Model No.: YSI Professional Plus  
Serial No.: 10D101565  
Equipment No.: ENO 00  
Date of Calibration: 10 January, 2012

**NOTES**

This is the Final Report and supersedes any preliminary report with this batch number.  
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

**ISSUING LABORATORY: HONG KONG**

**Address**

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11/F Chung Shun Knitting Centre  
1-3 Wing Yip Street  
Kwai Chung  
HONG KONG

**Phone:** 852-2610 1044  
**Fax:** 852-2610 2021  
**Email:** [hongkong@alsglobal.com](mailto:hongkong@alsglobal.com)

Mr Chan Kwok Fai, Godfrey  
Laboratory Manager – Hong Kong

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

**Work Order:** HK1201399  
**SUB-BATCH:** 1  
**Date of Issue:** 19/01/2012  
**Client:** SMEC ASIA LIMITED



**Description:** YSI Multimeter  
**Brand Name:** YSI  
**Model No.:** YSI Professional Plus  
**Serial No.:** 10D101565  
**Equipment No.:** ENO 00  
**Date of Calibration:** 10 January, 2012      **Date of next Calibration:** 10 April, 2012

**Parameters:**

**Dissolved Oxygen**

**Method Ref: APHA (21st edition), 4500O: G**

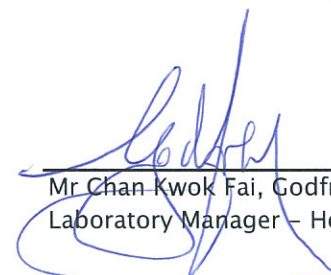
Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.84	6.00	0.16
7.49	7.60	0.11
8.70	8.84	0.14
Tolerance Limit ( $\pm$ mg/L)		0.20

**Temperature**

**Method Ref: Section 6 of International Accreditation New Zealand Technical**

**Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.**

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.0	9.1	-0.9
22.0	21.7	-0.3
35.0	34.3	-0.7
Tolerance Limit (°C)		2.0

  
 Mr Chan Kwok Fai, Godfrey  
 Laboratory Manager - Hong Kong

---

## APPENDIX 2

### Lake Water Quality Monitoring Data

Date	Time	Station	Salinity (g/ℓ)	Temperature (°C)	SS (mg/ℓ)	BOD5 (mg/ℓ)	DO Sat (%Saturation)	DO Conc (mg/ℓ)	Total Nitrogen (mg/ℓ)	Total Phosphorous (mg/ℓ)
11-Nov-11	8:50	W1	0.2	20.6	<b>51.0</b>	3.0	96.1	8.6	2.3	0.2
	8:45	W2	0.2	20.5	<b>50.0</b>	3.0	92.7	8.3	1.9	0.2
	8:35	W3	0.2	20.5	<b>70.0</b>	6.0	100.0	9.1	4.8	0.2
	8:30	W4	0.2	20.4	<b>80.0</b>	8.0	89.6	8.1	4.9	0.3
9-Dec-11	8:04	W1	0.1	18.6	<b>49.0</b>	2.0	84.0	7.8	1.6	0.1
	8:00	W2	0.1	18.3	<b>47.0</b>	2.0	83.0	7.8	1.6	0.1
	7:57	W3	0.3	18.1	<b>48.0</b>	6.0	79.2	7.5	2.1	0.1
	7:53	W4	0.3	17.8	<b>46.0</b>	7.0	78.0	7.4	2.5	0.1
13-Jan-11	7:55	W1	0.1	15.9	<b>27.0</b>	2.0	99.3	9.8	1.5	0.1
	7:50	W2	0.1	15.8	<b>26.0</b>	2.0	102.0	10.1	1.4	0.1
	7:45	W3	0.2	15.3	<b>44.0</b>	8.0	102.0	10.2	2.2	0.1
	7:41	W4	0.2	15.3	<b>43.0</b>	8.0	108.0	10.8	2.1	0.1
<b>Mean</b>			0.2	18.1	48.4	4.8	92.8	8.8	2.4	0.1
<b>Minimum</b>			0.1	15.3	26.0	2.0	78.0	7.4	1.4	0.1
<b>Maximum</b>			0.3	20.6	80.0	8.0	108.0	10.8	4.9	0.3

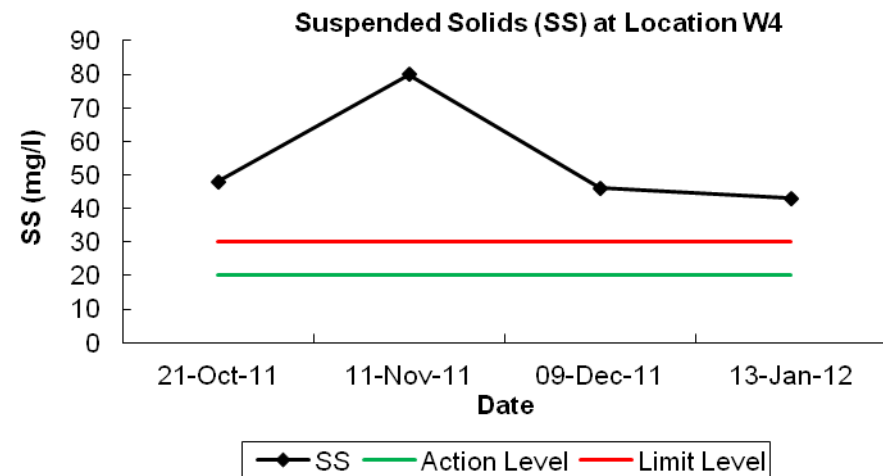
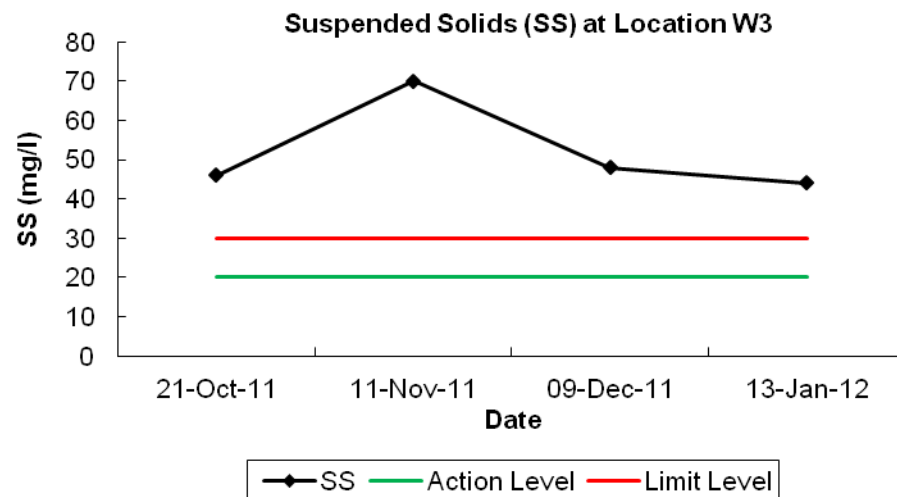
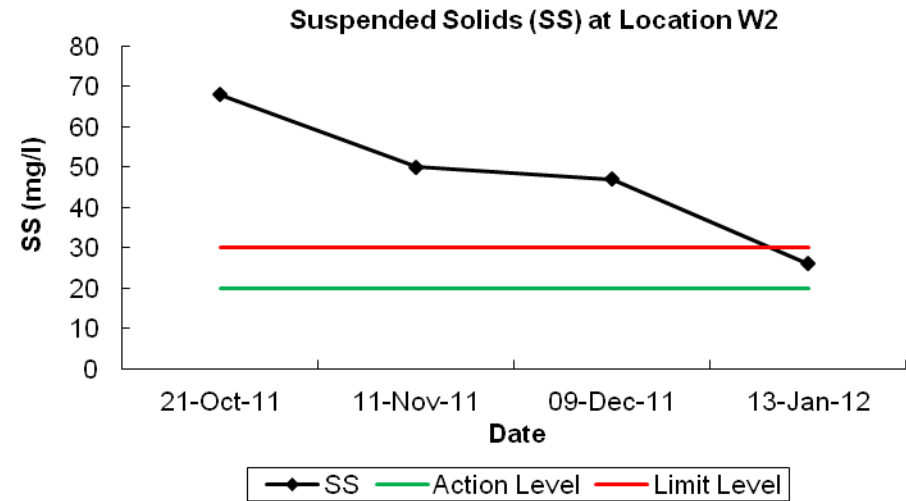
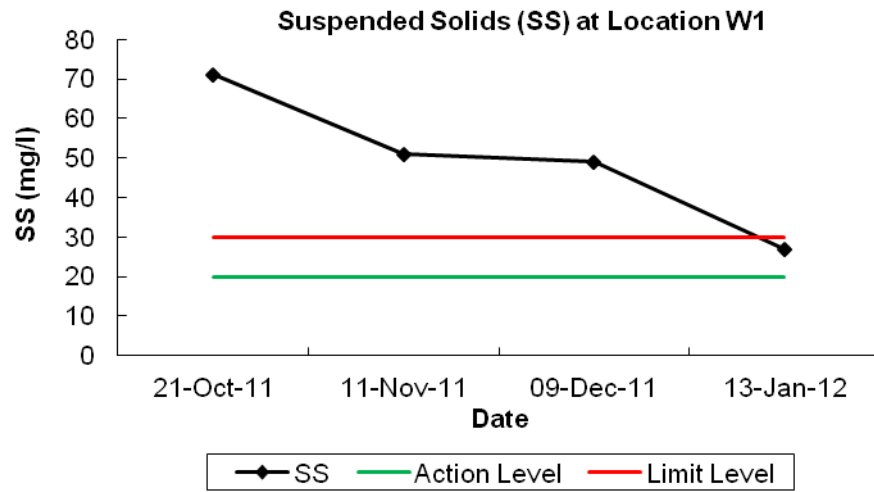
**Notes:** **Bold** indicates Action Level exceedance; **Bold** indicates Limit Level exceedance

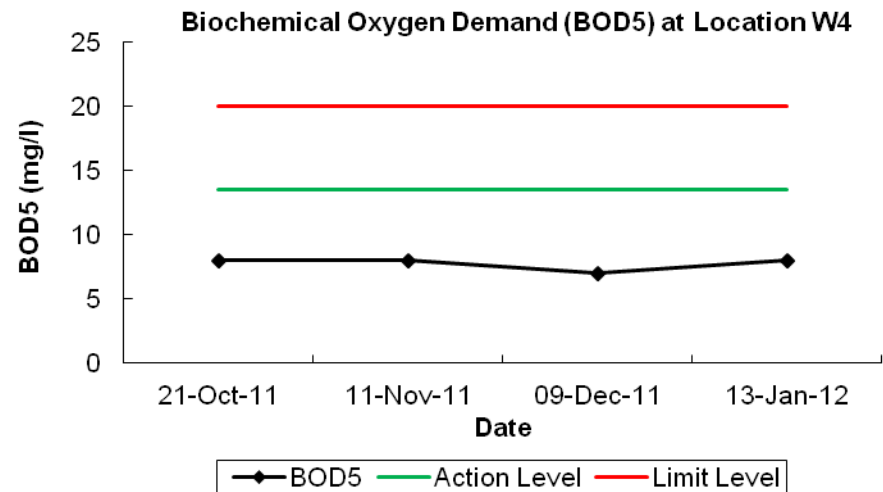
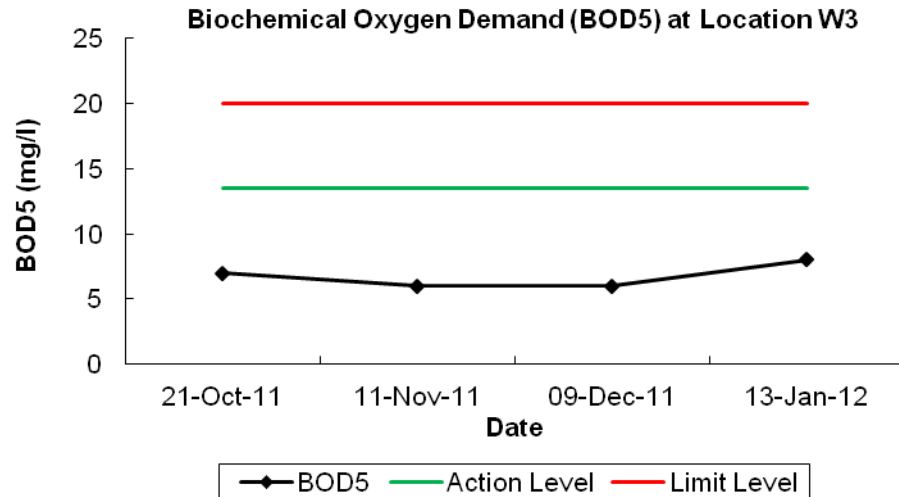
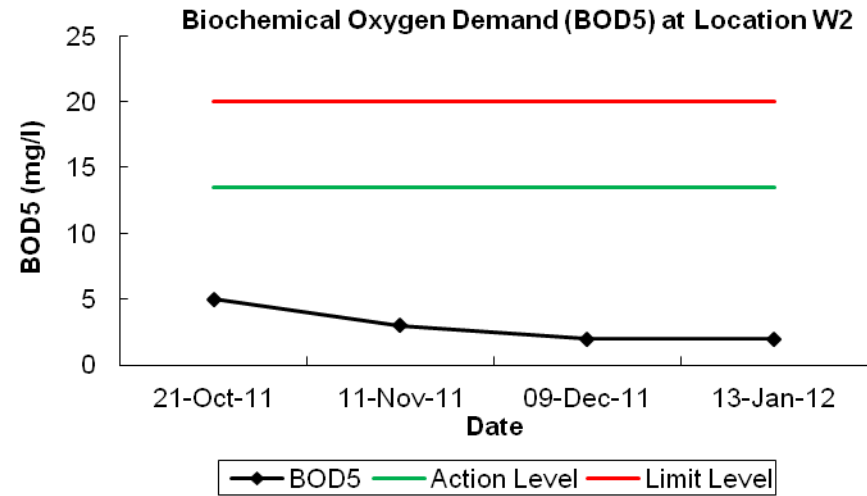
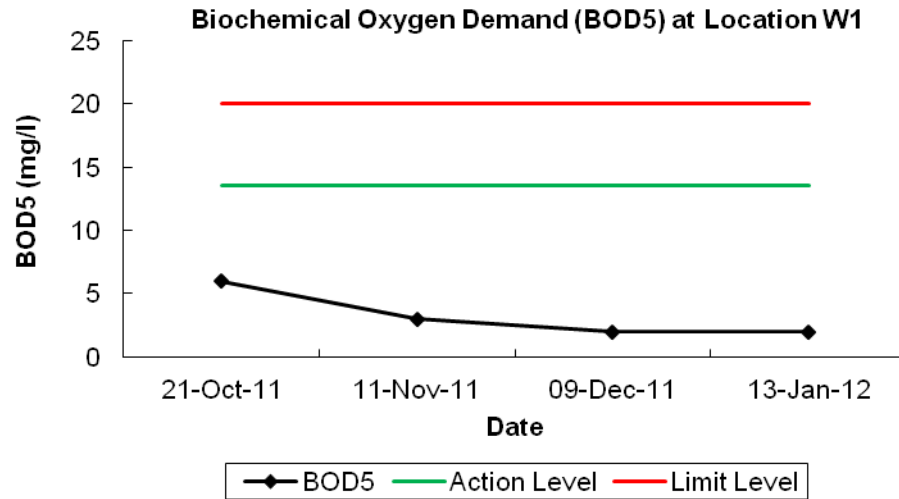
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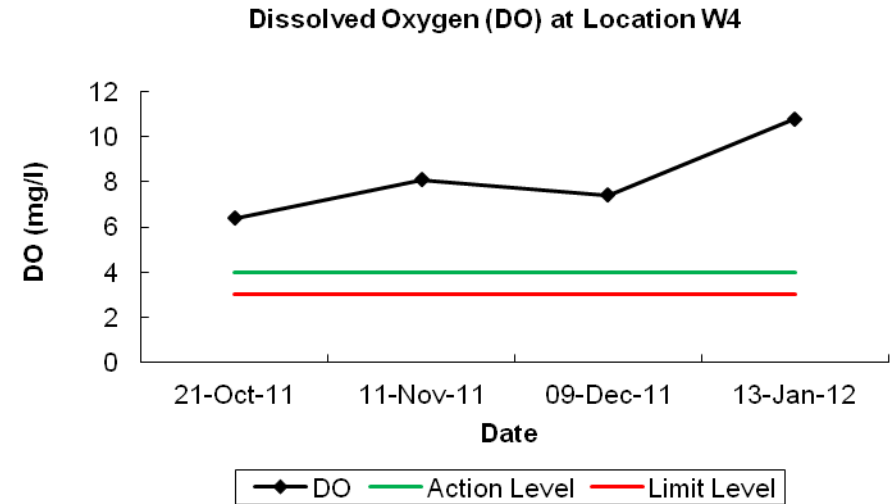
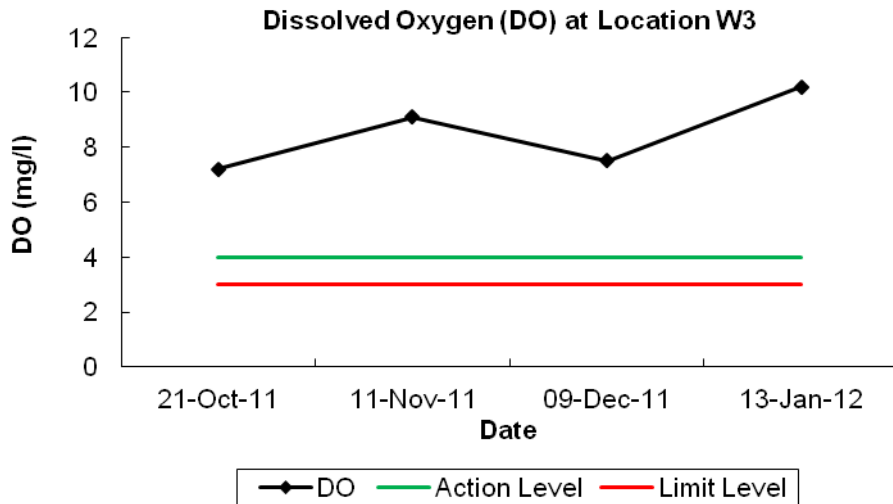
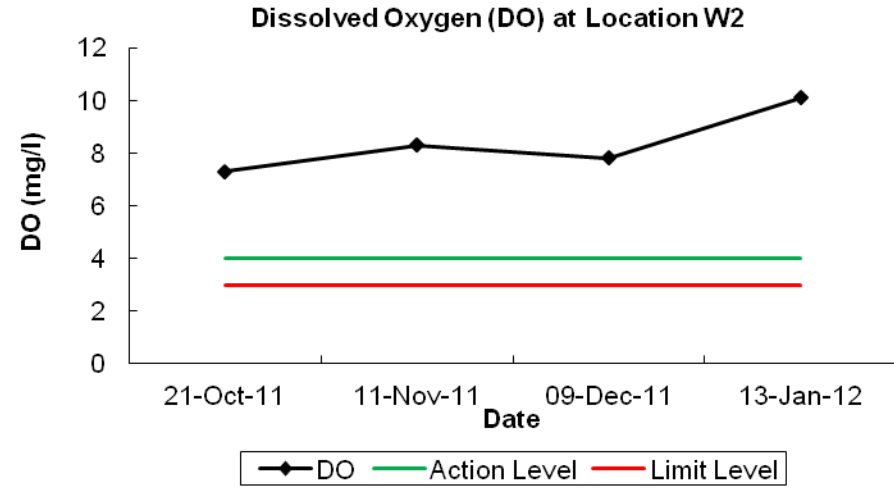
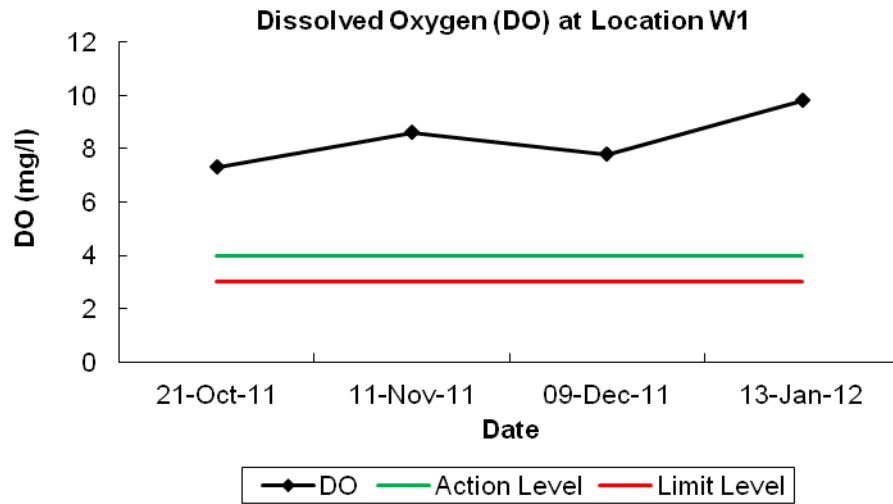
## APPENDIX 3

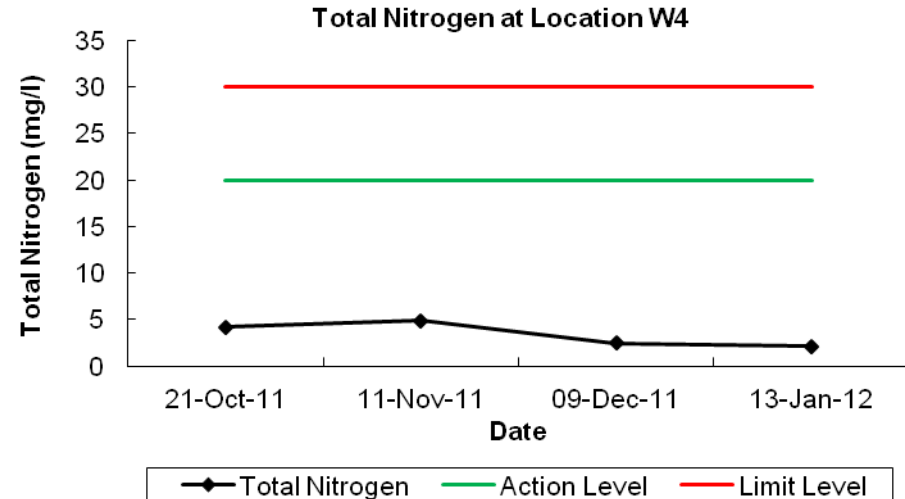
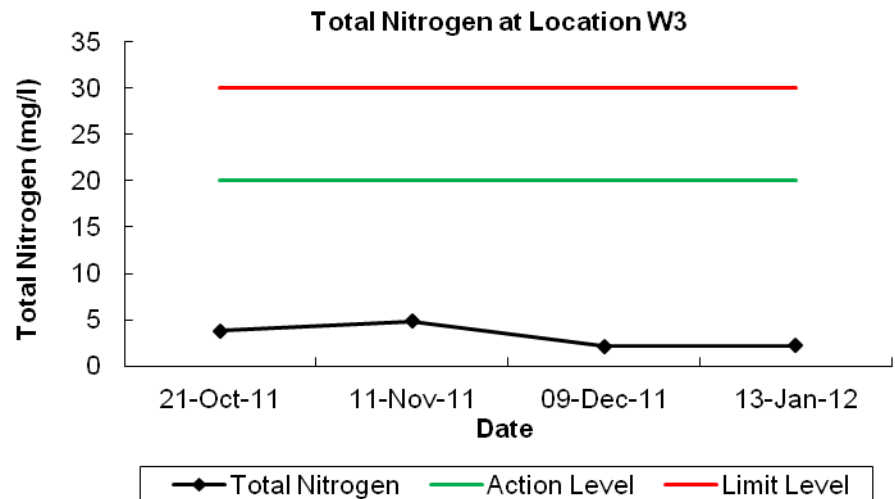
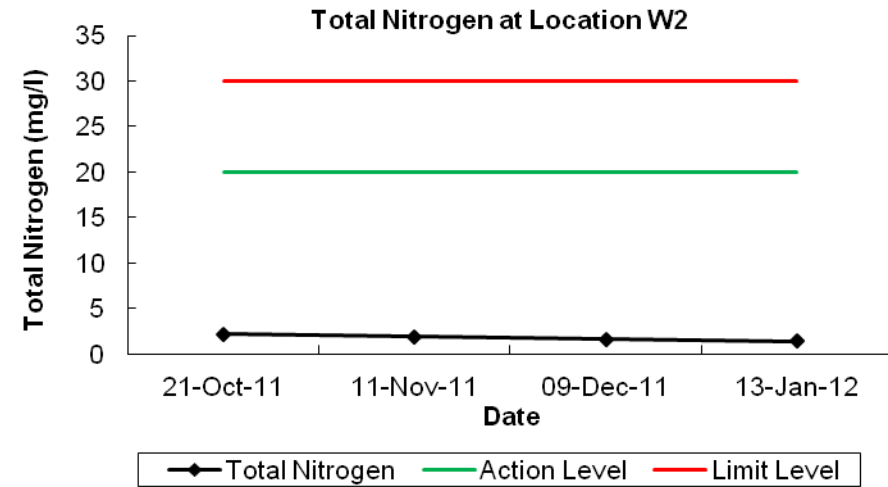
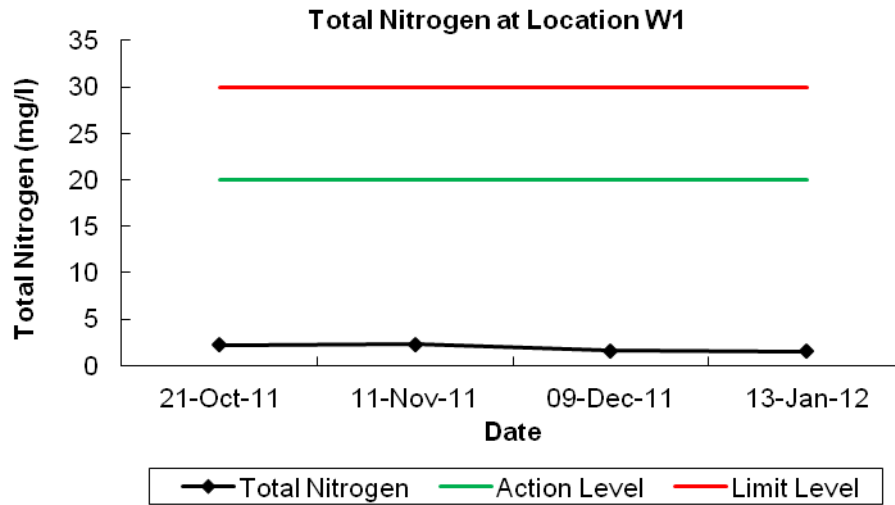
### Graphical Plots of Monitoring Data for the Past Four Months

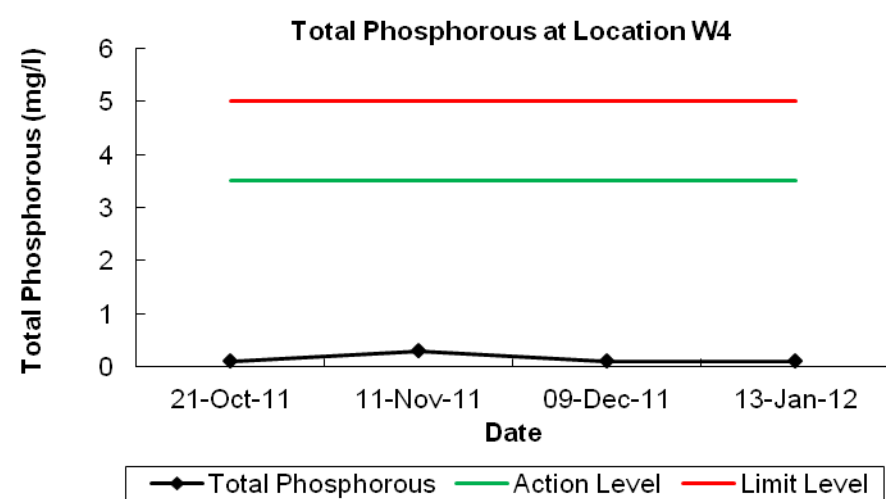
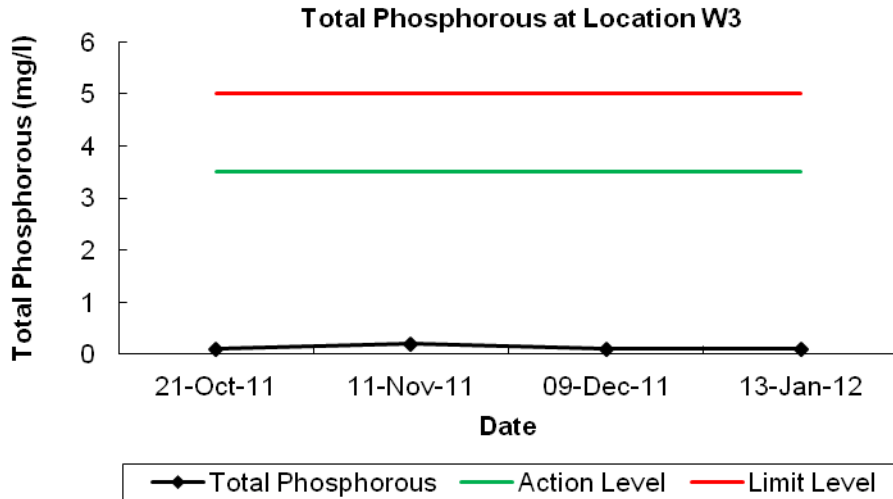
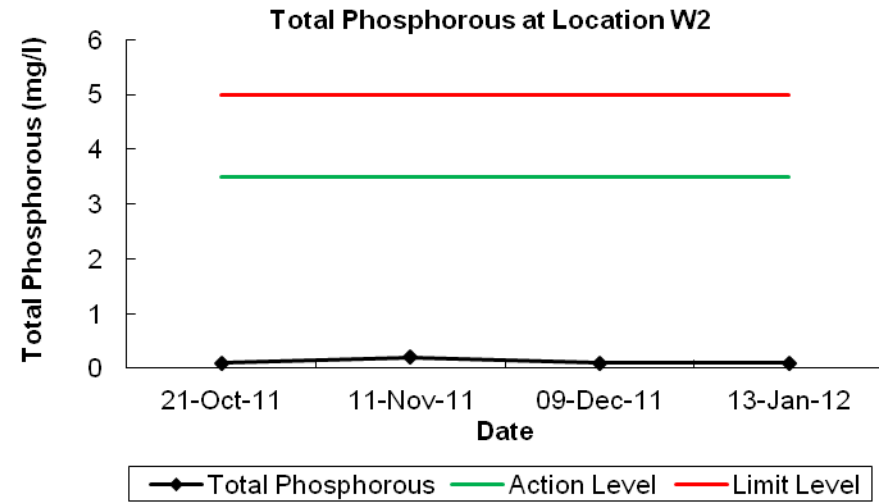
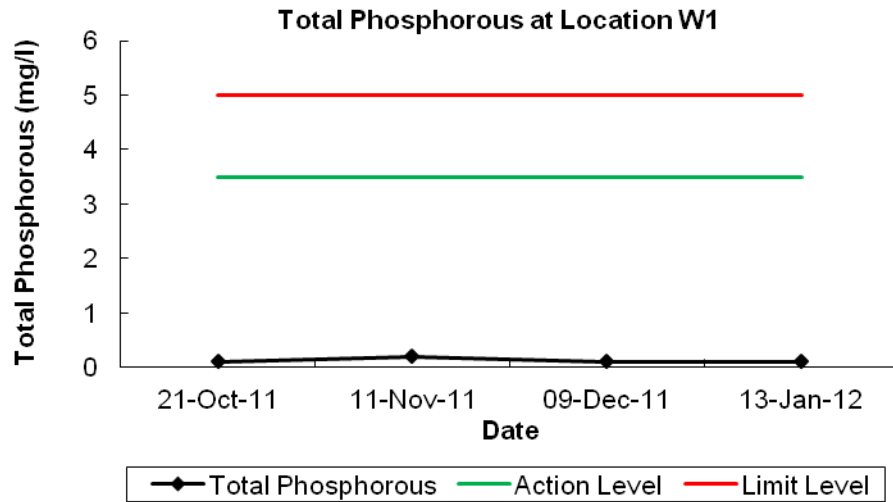












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## APPENDIX 4

### Aqua Bio-Trol Liquid – Product Datasheet

# Aqua Bio-Trol Liquid

## Liquid Microbial Pond Clarifier

PRODUCT DATA BULLETIN

### Features

- Eliminates pond scum and green, soupy conditions
- Improves water clarity
- Reduces foul odors and organic sediment
- Contains facultative bacteria capable of withstanding low oxygen levels
- Reduces levels of harmful nitrates & ammonia
- Effective under a wide range of climactic conditions
- Enhances conditions for all aquatic life
- Reduces biological oxygen demand
- Non-toxic, safe for fish, plants & applicator
- Microencapsulated, microbial stimulants

**Aqua Bio-Trol Liquid** is the safe, natural way to establish and maintain cleaner pond and lake water without chemicals. *Aqua Bio-Trol Liquid* eliminates pond scum and green, soupy conditions, while eliminating foul odors. *Aqua Bio-Trol Liquid* improves water clarity and digests excess organic matter in ponds, lakes and fountains.

**Aqua Bio-Trol Liquid** helps to create and maintain a healthier pond, lake and fountain water ecosystem through non-chemical treatment. *Aqua Bio-Trol Liquid* is an all natural, microbial based product effective for improving poor water conditions, and especially for maintenance of healthy water conditions once they are established. *Aqua Bio-Trol Liquid* is a concentration of naturally occurring microbes, which act to bring pond and lake water into proper ecological balance.

**Aqua Bio-Trol Liquid** is completely biodegradable and non-toxic to humans, animals and water life. The result of treatment is reduced organic sediment and particulate, reduced sludge, clear water, and enhanced conditions for all aquatic life.

**Aqua Bio-Trol Liquid** microbes preemptively consume organic matter which feeds algae and which leads to anaerobic conditions, including bad odors. The active microbes in *Aqua Bio-Trol Liquid* feed on excess nutrients in the entire water column, from sludge at the bottom to suspended particulate, to green organic matter on the surface. Routine application helps keep water in it's best condition without the use of potentially harmful chemicals.



### DIRECTIONS FOR USE

**Aqua Bio-Trol Liquid** is most effective when water temperatures range from 50° to 100° F. For best results, provide adequate surface or subsurface aeration. Subsurface aeration is preferred. For maximum efficiency, assure a minimum of 5-6 % dissolved oxygen.

Apply by distributing liquid as much as possible around pond and lake edges. Avoid dumping liquid in one location.

Pond Volume	Initial Treatment	Monthly Maintenance
Acre Foot 325,900 gallons	4 gallons	2 gallons

### Formulas to help in your calculations

- Length x Width x Depth (feet) x 7.48 = Number of Gallons
- One acre-foot of water = 325,900 gallons
- One acre-foot of water = 1,233 CuMt

### Active Ingredients

A proprietary blend of 58 strains of aerobic and facultative beneficial bacteria at a minimum concentration of 6.6 x 10<sup>7</sup> CFU per ml (including *Bacillus subtilis*)

**Warranty:** Seller warrants that the product conforms to its chemical description and is reasonably fit for the purpose stated on the label when used in accordance with directions under normal conditions of use; but neither this warranty nor any other warranty of merchantability or fitness of a particular product expressed or implied, extends to the use of this product contrary to label conditions, or under conditions not reasonably foreseeable to the seller; and buyer assumes the risk of any such use.



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