Land and Water Science
Invercargill, 9810

Stephen Parry
Chief Executive
Gore District Council
PO Box 8
Gore, 9740

7th July 2020

Dear Stephen

RE: NH_3 Monitoring Report 01 – 31 May 2020

Background

Gore District Council (GDC) engaged Land and Water Science to conduct continuous monitoring of ammonia (NH_3) gas emissions from the Mataura Mill dross storage site (121 Kana Street, Mataura) from May 2018. GDC require emission values to comply with consent conditions that specify a limit of 5 ppm NH_3 discharged to air.

In May 2017, Photonic Innovations (PI) installed two NH_3 sensors for comparison of the indoor and outdoor ammonia levels. Measurements were recorded continuously and reported as a 5-minute average for both the outdoor and indoor sensors. In May 2020, Photonic Innovations ceased operating, resulting in the loss of the dashboard functionality to access sensor data via the web. Land and Water Science have devised a means to retrieve the outdoor sensor data and continue to monitor and report on the ammonia emission at the site.

May Summary

Weekly summaries of outdoor emission results from monitoring between 01 May and 31 May are presented in this report. During this period the maximum NH_3 concentration detected by the outdoor sensor was 4.2 ppm (Figure 1 and Table 1). Maximum mean and median NH_3 concentrations during this period were 0.8ppm and 0.8ppm for the outdoor sensor. The maximum ammonia concentration remained below the consented amount of 5.0 ppm throughout May.

Daily (diurnal) variation in NH_3 concentration shows a consistent pattern in the data. Specifically, NH_3 concentration is strongly correlated with air temperature, reaching maximum values as air temperatures peak during the day and minimum values at night when air temperatures are at their lowest. Although diurnal variation is evident in the data, average air temperature is a greater control over the absolute concentration with maximum concentrations recorded during the warmest months of the year and minimum concentrations recorded during the coolest months of the year. The correlation between air temperature and NH_3 concentration for this reporting period is displayed in Figure 1.

Table 1. Summary statistics for the Outdoor NH_3 sensor, 01 May – 31 May 2020. NH_3 measured in parts per million (ppm).

Date	01-02 May	03-09 May	10-16 May	17-23 May	24-31 May
Mean	0.7	0.7	0.7	0.8	0.8
Std Dev	0.3	0.2	0.2	0.2	0.2
Median	0.7	0.7	0.7	0.7	0.8
Minimum	0.4	0.4	0.4	0.4	0.5
Maximum	2.8	2.6	4.2	2.1	2.4

01 - 02 May 2020

Outdoor NH_3 concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 2.8 ppm for this period. Outdoor mean and median values were 0.7 and 0.7 ppm respectively.

03 – 09 May 2020

Outdoor NH_3 concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 2.6 ppm for this period. Outdoor mean and median values were 0.7 and 0.7 ppm respectively.

10 – 16 May 2020

Outdoor NH_3 concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 4.2 ppm for this period. Mean and median values were 0.7 ppm and 0.7 ppm respectively.

17 – 23 May 2020

Outdoor NH_3 concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 2.1 ppm for this period. Mean and median values were 0.8 and 0.7 ppm respectively.

24 – 31 May 2020

Outdoor NH_3 concentration levels showed consistent variation for most of the week with higher concentrations consistent with warmer temperatures. Maximum outdoor concentration was 2.4 ppm for this period. Mean and median values were 0.8 and 0.8 ppm respectively.

Summary

During the monitoring period (01 – 31 May) Outdoor NH_3 concentrations reached a maximum of 4.2 ppm, while maximum mean and median concentrations were 0.8 and 0.7 ppm respectively. The outdoor sensor remained below the consent conditions of 5.0 during the month of May. These values are consistent with cooler outdoor temperatures. Overall, temperature continues to be the most dominant control over NH_3 concentration.

Kind regards

Richard Dean
Consultant Engineer
Land and Water Science Ltd

Dr Lisa Pearson
Lead Earth and Environmental Scientist
Land and Water Science Ltd

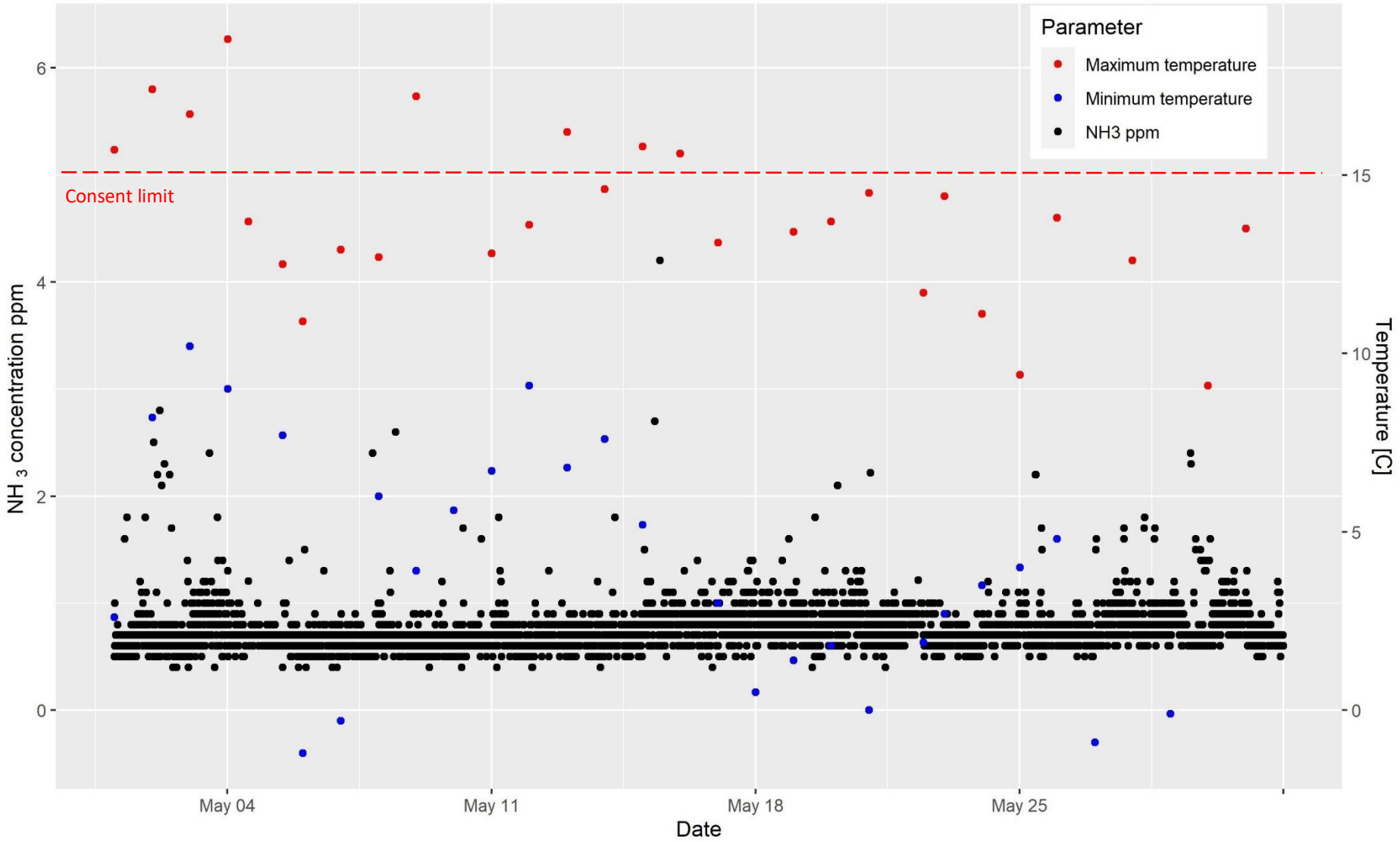

Figure 1: Continuous outdoor NH_3 concentration and maximum daily temperature.